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ABSTRACT

This report describes the background, selection, planning, conduct, and evaluation of the ten research training presessions, serving 402 educational researchers, conducted by the American Educational Research Association from 26 February to 2 March 1970 prior to its annual meeting in Minneapolis. Topics of the sessions were 1) Survey Research in Education; 2) A Social Systems-Field Studies Paradigm for Research on Organizational and Administrative Phenomena in Education; 3) Systems Techniques in Counselor Education and Counseling Program Research; 4) Research and the Development of Instructional Theory; 5) Applied Linear Regression Analysis in Educational Research; 6) Human Behavior Genetics and Its Implications for Educational and Behavioral Research; 7) A Systems Approach to Instructional Research and Design; 8) Person-Free Item Calibration and the Item-Free Person Measurement; 9) Multivariate Statistical Analysis in Educational Research; 10) Powerful Statistical Techniques for Qualitative as well as Quantitative Variables. Detailed descriptions for each session comprise the major portion of the report. Evaluation results indicated that although some participants were dissatisfied with the physical setting of the sessions, the vast majority rated very high the content and instruction of the sessions. (RT)

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1970 AERA RESEARCH TRAINING PROGRAM

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for the

American Educational Research Association
1126 Sixteenth Street, N.W.
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A training program centered on increasing the research competencies of highly trained educators requires the concentrated efforts of many concerned individuals especially when the training is to add to the skills already possessed by the participating students. This, as in past years, AERA was able to recruit the services of an exceptionally able staff of directors, instructors, and logistic personnel. Thus, the author of this report wishes to acknowledge the efforts of the numerous individuals who made possible the conduct of the 1970 AERA Research Training Sessions. Prominent among these, of course, were the directors and the staff members of the training sessions. These individuals devoted far beyond the required energy in order to insure high quality of the training programs. The names of these individuals are cited in the report.

Another group which must be commended is the 1970 AERA Presessions Committee. These persons, also identified later in the report, exercised their responsibilities to make policy decisions and select top caliber training programs. The subsequent evaluations of the training sessions by participants suggest that the committee performed its selection task with considerable skill.

Finally, the central staff of the American Educational Research Association led by Richard A. Dershimer should receive special acknowledgement. Without the constant guidance and support of Gary E. Hanna and Michael J. McCormick, the excellent outcomes of the individual Presessions could not have been attained. In many respects it is not possible to indicate how much Mr. Hanna contributed of his time and ability to make the Presessions successful. Both of these young men worked diligently to insure that the training sessions were supported properly, both administratively and financially, at all times.

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the Presession directors. Finally, thanks are due Mr. Thomas W. Little who handled all correspondence and typed the many drafts and final copies of the original proposal, form letters, questionnaires, etc., and the many drafts and final copy of the report you are about to read.

Leonard A. Marascuilo
15 June 1970

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INTRODUCTION

During 26 February to 2 March 1970 the American Educational Research Association (AERA) conducted a program of ten research training presessions prior to the annual meeting of the Association in Minneapolis. The presessions served 402 educational researchers. The costs of the program were borne by AERA, the U. S. Office of Education, and the participants themselves. This report describes the background, selection, planning, conduct, and evaluation of the 1970 AERA Research Training Sessions.

BACKGROUND OF THE RESEARCH TRAINING SESSIONS

The 1970 presession programs can trace their origins to informal meetings of one or two days duration involving a relative handful of selected researchers prior to the 1964 and 1965 annual AERA meetings. The 1964 and 1965 informal meetings were not widely publicized and really did not have the training of researchers as their primary mission. However, they can be regarded as the precursors of the AERA research training sessions since in 1966 the prototypical "presession" was held as one of a group of three meetings in the tradition of these previous preconvention meetings. The 1966 presession which set a pattern, thereafter adopted for the AERA presession programs, was a session dealing with experimental design under the direction of Richard E. Shutz. This 1966 presession on experimental design was the first five-day presession sponsored by AERA and was, in addition, the first formal research training program completed under Title IV of the Elementary and Secondary Education Act of 1965. Further, the session directed by Schutz was the initial presession in connection with a professional meeting that was systematically evaluated with respect to the attainment of its objectives.

Because of the success and acceptance of the 1966 presession on experimental design, coupled with a growing interest of AERA members in the possibility of expanding and formalizing other presession meetings, AERA sponsored a program of six courses in the 1967 presession program under the general chairmanship of Richard E. Schutz. These sessions and their directors were the following:

1. Bayesian Statistical Analysis
   Donald Meyer, Syracuse University

2. Curriculum Research and Evaluation
   Robert L. Baker, Arizona State University
   W. James Popham, University of California, Los Angeles

3. Design and Analysis of Comparative Experiments in Education
   Gene V. Glass, University of Illinois

4. Educational Research Management Procedures
   Desmond Cook, Ohio State University

5. Multivariate Design and Analysis in Educational Research
   Joe Ward, Southwest Educational Development Laboratory

6. Research Strategies with Culturally Deprived Children
   Martin Deutsch, New York University

The 1967 presession program was supported in part by a grant from the U. S. Office of Education under Title IV of ESEA, 1965. Approximately 500 researchers applied for the program and somewhat more than 300 researchers actually participated.

The response to the extended 1967 program was highly positive and led to a much expanded program of eleven presessions in 1968 under the chairmanship of Gene V. Glass. The 1968 sessions were the following:

1. Research in Reading Instruction
   John R. Bormuth, University of Chicago

2. Educational Research Management Procedures
   Desmond L. Cook, Ohio State University

3. Anthropological Field Methodology in the Study of Education: With Particular Emphasis on Classroom Behavior and School Administration
   Frank W. Lutz, New York University

4. Nonparametric Methods in Educational Research
   Leonard A. Marascuilo, University of California, Berkeley

5. Design and Analysis of Comparative Experiments
   Jason Millman, Cornell University

6. Evaluation: New Concepts in Scope, Strategy and Purposes
   C. Robert Pace, University of California, Los Angeles

7. The Computer and Natural Language
   Ellis B. Page, University of Connecticut

8. Instructional Product Research
   W. James Popham, University of California, Los Angeles
   Howard Sullivan, Southwest Regional Laboratory for Educational Research and Development

9. On-line Computer Applications in Educational Research
   Ronald G. Ragsdale, Ontario Institute for Studies in Education

10. Multivariate Design and Analysis in Educational Research
    Joe H. Ward, Southwest Educational Development Laboratory

11. Developmental Processes in College Students
    Jonathan R. Warren, Educational Testing Service

The 1968 presessions program was also supported in part by a grant from the U. S. Office of Education under Title IV of ESEA, 1965. Nearly 750 individuals applied for the program and approximately 550 actually participated.

The 1969 sessions were the following:

1. Research in Instructional Product Development
   Robert L. Baker

2. Nonparametric Methods and Associated Post Hoc Procedures in Educational Research
   Leonard A. Marascuilo

3. The Computer and Natural Language
   Ellis B. Page

4. Research on Methods for Improving Children's Learning Proficiency
   William D. Rohwer, Jr.

5. Systems Approach in Counseling and Counselor Education
   T. Antoinette Ryan

6. Multivariate Design and Analysis in Educational Research
   Joe H. Ward, Jr.

7. Anthropological Methods in Education Research
   Harry F. Wolcott

8. Sample Free Test Calibration and Person Measurement in Educational Research
   Benjamin D. Wright

9. Survey Research in Education
   James G. Anderson

10. Multiple Group Discriminant Strategy
    Paul R. Lohnes

11. Bayesian Statistical Analysis
    Donald L. Meyer

12. Design and Analysis of Comparative Experiments
    Kenneth Hopkins
    Jason Millman

The 1969 presession program was also supported by the U. S. Office of Education with eight sessions held in Los Angeles prior to the annual meeting of AERA and with four sessions held in College Park, Maryland, following the annual meeting. Over 650 individuals applied for the programs and approximately 550 participated.

THE 1970 RESEARCH TRAINING SESSIONS

In the late spring of 1969 AERA president Roald F. Campbell appointed the following Research Training Presessions Committee:

Leonard A. Marascuilo, Chairman
University of California, Berkeley

Gary E. Hanna, AERA Assistant for Professional Affairs

Division	Representative
A-Administration	Frank Lutz, Pennsylvania State University
B-Curriculum and Objectives	James MacDonald, University of Wisconsin
C-Learning and Instruction	Joe L. Byers, Michigan State University
D- Measurement and Research Methodology	Calvin Dyer, University of Michigan

E-Student Development and Personnel Services	Carl E. Thoresen, Stanford University
F-History and Historiography	Mark B. Beach, University of Rochester
G-Social Context of Education	Edward L. McDill, The Johns Hopkins University

As in the past, it was considered advisable to extend the opportunity to propose a presession to any member of AERA (primarily by means of a call for proposals in the newsletter of the organization) and to solicit proposals from some 200-300 respected educational researchers who might wish to propose a presession if invited. In accord with these suggestions, the following notice was placed in the April 1969 issue of the Education Researcher and in other journals read and used by educational researchers.

> "Potential directors for the 1970 AERA Presessions, to be held in Minneapolis, Minnesota during the last week of February 1970, are being sought among the ranks of AERA members. The Presession Committee plans to place a proposal for approximately eight five-day Presessions in the hands of a granting agency in August.
>
> "Any AERA member interested in proposing and directing an AERA Presession for 1970 should write the Presession Committee Chairman, Leonard A. Marascuilo, for a proposal outline. Proposals are expected to be brief (no more than three or four pages) and tentative. There are no restrictions on content; it is hoped that a broad range of topics (non-methodological as well as methodological) will be proposed. The emphasis in the 1970 Presessions will once more be training, i.e., providing participants with specific competencies of relevance to their research activities. It is hoped that research methods relevant to the urban education problem can be represented in this year's Presessions. The deadline for receipt of proposals is July 15, 1969. The Presession Committee will meet shortly thereafter to select those Presessions deemed worthy of support.
>
> "Request for proposal outlines and inquiries should be addressed to Leonard A. Marascuilo, 4511 Tolman Hall, University of California, Berkeley, California, 94502."

A similar call for proposals was sent to numerous outstanding researchers known to the members and chairman

of the Presession Committee. The formidable task of choosing only a portion of those proposals received fell to the Presessions Committee on July 24, 1969 at O'Hare International Airport in Chicago. The following individuals were in attendance:

Division	Representative
A	Dr. Frank Lutz
B	Dr. James MacDonald
C	Dr. Joe L. Byers
D	Dr. Calvin Dyer
E	Dr. Ray Hosford, University of Wisconsin, for Dr. Carl E. Thoresen
F	Dr. Mark B. Beach
G	Dr. Edward L. McDill
	Dr. Leonard A. Marascuilo, Chairman
	Mr. Gary E. Hanna, AERA Asst.

Following is a summary of the meeting:

The meeting commenced with a reaffirmation of the statement of training session purpose which had been approved by last year's Presessions Committee. The focus on training or disseminative sessions as opposed to seminal or generative sessions was particularly noted. It was agreed that in judging the proposals for AERA presentation, candor and professional honesty would be given high honor and that any comments of an evaluative nature made during the meeting would be treated with complete confidentiality.

In addition, it was decided that because the quality of the presessions of previous years had been excellent, every attempt would be made to maintain this excellence with the selction of the best possible set of possible presessions. If two or more different groups submitted identical or similar proposals, and if the selection committee could not single out any one as the best, then the final decision would be based upon the known competencies of the director and instructional staff. It was the opinion of the members of the selection committee that fame as a researcher offered some valid measures concerning the quality of the instruction to take place during the presessions; the intent being

that anyone who is a competent researcher is, by association, also a good teacher.

Other business discussed and agreed to by the Committee, but not directly pertinent to the proposal, was the decision to give the Committee continuity over time by the selection of the members on a rotating basis to a two year membership. The reason for this two years of service is to insure better proposal preparation for the following AERA presessions and to make future presessions more relevant to the needs of the members of the parent organization. In this sense, this decision is directly related to proposals that AERA will make to the U. S. Office of Education in subsequent years.

In selecting the best possible set of presessions for the coming year, the following 10 criteria were used by each evaluator:

Director and Tentative Staff
1. Experience and capability.
2. Is the staff adequate for stated objectives?

Content
3. Importance or need for topic.
4. Appropriateness to presession format.

Instructional Objectives
5. Clarity.
6. Usefulness of competencies to be promoted.

Anticipated Audience
7. Is audience appropriate for stated objectives?

Tentative Schedule
8. Extent of planning.

Proposed Evaluation Activities
9. Extent of planning.

Overall Rating
10. Value to educational research.

In addition, each evaluator gave the proposals an overall rating of:

1. Reject
2. Accept Conditionally
3. Accept Unconditionally

Using the overall ratings at the outset, several initial 'rounds' for evaluation were used to screen out those proposals considered inappropriate for one reason or another. The proposals surviving the first

and subsequent elimination rounds were then discussed at considerable length. After several hours and the use of numerous ranking schemes, ten proposals were selected as worthy of support.

The procedure agreed to at the meeting was to contact the ten directors by mail as soon as possible and inform them of the decision of the Committee. The 'rejectees' were sent airmail letters which described the Committee's decision and the reason for that decision. In addition, the submitter of the proposal was thanked for his expression of interest and if the committee thought that the proposal deserved further consideration for next year's program, the submitter was given specific recommendations to improve the proposal and/or was asked to correspond directly with the committee representative of his division of AERA.

The Committee also decided to produce its own evaluation procedure for each of the presession. For this evaluation, each member of the Committee agreed to draft an evaluation sheet which would be sent to the Chairman of the Committee. The Chairman would then produce a first draft of the evaluation sheet which would then be reviewed by each member of the Committee. They would then critique this first draft, send their recommendations to the Chairman who would then prepare a second draft. This second draft would be reviewed with the presession directors at the organizational meeting to be held in November 1969. From their recommendations, a final evaluation sheet would be prepared. The final evaluations forms will be administered by an AERA representative in Minneapolis who will also be in charge of the hotel, meeting, and other arrangements required by the presession directors. Finally, suggestions were also made regarding presession topics for 1971. These suggestions are to be relayed to next year's Presession Committee Chairman.

The AERA Research Training Presessions Committee was gratified at the response to its call for proposals and was pleased to have secured the services of the respected group of scholars who agreed to conduct research training sessions.

The call for presession proposals published in the Educational Researcher plus personal notes from members of the Presessions Committee produced a total of 21 proposals. The titles of the 11 proposals which were not accepted follow:

1. Research in Methods of Indexing for Users of Non-Book Educational Materials

2. Students in High School: Research Approaches to Understanding

3. Instructional Systems Design for Research

4. Techniques in Programmatic Instructional Development.

5. Direct Observation as a Research Technique

6. Organizational and Group Behavioral Theory in Educational Administration

7. The evaluation of curricula: What to Evaluate and how to Evaluate.

8. Piagetian Research and Mathematical Curriculum Research

9. Foundations of Educational Evaluation

10. Research in the Psychology of Curriculum

11. Methods for Multivariate Data Analysis in Education and Psychology: Theory and Applications

The titles of the proposals which were selected for presentation and the names of the directors are listed below:

1. Survey Research in Education
   James G. Anderson, New Mexico State University

2. A Social Systems-Field Studies Paradigm for Research on Organizational and Administrative Phenomena in Education
   Douglas R. Pierce, California State Polytechnic College

3. Systems Research for Counselor Education, Counseling and Related Research
   T. Antoinette Ryan, University of Hawaii

4. Research and the Development of Instructional Theory
   Thomas J. Shuell, State University of New York at Buffalo

5. Applied Linear Regression Analysis in Educational Research
   Joe H. Ward, Jr., Southwest Educational Development Laboratory

6. Human Behavior Genetics and Its Implications for Educational and Behavioral Research
   Steven G. VAndenberg, University of Colorado

7. A Systems Approach to Instructional Research and Design
   Stephen L. Yelon, Michigan State University
   Roger O. Scott, Southwest Regional Laboratory for Educational Research and Development

8. Person-Free Item Calibration and Item-Free Person Measurement
   Benjamin Wright, University of Chicago

9. Multivariate Statistical Analysis in Educational Research
   M. I. Charles E. Woodson, University of California, Berkeley

10. Powerful Statistical Techniques for Qualitative as Well as Quantitative Variables
   Douglas A. Penfield, Rutgers University
   Maryellen McSweeney, Michigan State University

It should be noted that five of the sessions are based directly on experience obtained in conducting previous presession training programs funded by the Office of Education. Effective training programs do not arise overnight. The 1970 sessions are making use of the best of pre-1970 research training experience and the needs of the AERA membership. Some of the skills taught at some of the repeat presessions are invaluable to many educational researchers because of their basic connections to empirical research and investigations. The committee expressed the point of view that as long as a need for a specific topic exists, AERA should meet and attempt to satisfy this need. However, this should not be interpreted to mean that once a presession is approved it will continue to be approved each time the director submits a proposal. Instead, it should be interpreted to mean that if a research need continues and if no new group of researchers submits a similar and better proposal, then the committee will have a tendency to look with favor upon a repeat presession because of its importance to the members of AERA.

After notification of acceptance, the 10 presession directors revised their proposals so that they were incorporated into an AERA proposal to the U. S. Office of Education. This proposal was subsequently approved for funding by USOE.

A meeting was held on 25 November 1970 in Minneapolis with all 10 training session directors present. Discussions of the forthcoming presessions centered around procedures for processing applications, in addi-

tion to many other procedural and substantive issues. The initial agreement concerned the method of processing applications. The decision of the group, after considerable deliberation, was to set no deadlines for applications, but to judge applicants in the order in which they were received on the basis of each applicant's qualifications. In essence, the agreement reached was to employ a criterion-referenced rather than a norm-referenced scheme for accepting applicants. The step-by-step procedure for processing applicants to the 1970 training sessions is described below.

PROCEDURES FOR PROCESSING APPLICANTS TO 1970 AERA TRAINING SESSIONS

1. All applications received by Professor Marascuilo were recorded and mailed to the first choice director.

2. First choice director made an accept or reject decision within two or three days after receiving applications. The very first few applications which trickled in could be retained somewhat longer.

    a. If an applicant was accepted, the director sent the acceptance letter to the applicant and added applicant's name to a list of accepted participants which was sent weekly to Professor Marascuilo.

    b. If the applicant was rejected, the application was sent directly to the second choice director or, if no second choice was given, it was sent back to Professor Marascuilo.

3. The second choice directors also made accept or reject decisions within two or three days after receiving applications.

    a. If an acceptance was made, an acceptance letter was sent by the director, and the applicant's name was added to the list being sent weekly to Professor Marascuilo.

    b. If rejected, application form was returned to Professor Marascuilo.

4. Letters informing all rejected applicants were sent by Professor Marascuilo. If certain directors wished to do so, they sent "sorry" letters also, but it was not necessary. Rejectees were invited to apply to other sessions in which they were interested.

5. Weekly totals of applicants accepted in all of the sessions were mailed to each director.

6. Directors for whom large numbers of participants presented no instructional problem were urged to accept as many qualified applicants as possible.

ANONYMOUS EVALUATIONS OF THE TRAINING SESSIONS

This year an anonymous evaluation was made by the participants of the various presessions attended. This was achieved by means of a modified questionnaire used for the 1969 AERA Presessions. The questionnaire was administered by the Presession Director and assistants on the morning of the last day of the Presessions. The exact form of the questionnaire is as follows:

AERA 1970 Research Training Sessions

Participant Evaluation Form

1. What was the name of your session?

2. The overall quality of instruction in your session was:

   Excellent Good Average Fair Poor

3. Leaving aside the quality of instruction for the moment, do you think the topic treated in your session should be included in next year's Presession Program?

   Yes No

4. If you had it to do over again, would you apply for the session which you have just completed?

   Yes No

5. If this same session is held again, would you recommend that others attend?

   Yes No

6. Did you stay at a convention hotel ___ At home ___ With friends or relatives___ Other ___

7. How much money did it cost to attend this session? How much of this cost will be reimbursed to you?

8. Where did you first learn about the training session?

   Educational Researcher Professional journal

   A one sheet announcement Other (Specify)

9. How good was the scheduling and management of the Presession you attended?

   Very good Good Poor Very poor

10. How good were the meeting room facilities for the Presession you attended?

    Very good Good Poor Very poor

11. Do you think you had the appropriate prerequisites or prior knowledge to make what you learned at this Presession of research, teaching, or administrative value to you?

    More than necessary Just the right amount

    Not enough

12. Did the teaching staff make sufficient allowance for the variability in prior knowledge brought to the Presession by the participants?

    Nearly all of the time Most of the time

    Some of the time Hardly ever

13. Was there sufficient time for you to interact with the staff with respect to information and knowledge presented in the Presession?

    Yes No

14. Did you wish to discuss research problems that had arisen in your own work with staff members?

    Yes No

    If 'Yes,' was there an opportunity to pursue this interest?

    Quite a lot Some None at all

15. Did the amount of work required by the staff of the participants seem acceptable to you? There was:

    Too much Just about right Too little

14.

16. Will you use what you have learned in your own teaching or research in the <u>immediate</u> future?

Yes No

17. Will you use what you have learned at a later date in future research or teaching?

Yes No

18. Would you like to learn more on the topic you studied here?

Yes No

19. Was five days a sufficient time to learn and master the material of your Presession?

Yes No

If 'No,' would you attend a seven day or two week Presession on the same material?

No Yes, seven days Yes, two weeks

20. Please write any additional comments and/or suggestions in the space below, or on the reverse side.

In Table 1 are shown the percentage distribution of responses to the question related to the overall quality of the instruction for the ten presessions. As can be seen, most of the participants thought that the quality was excellent or good, with 87 percent of the respondents choosing these two response categories. Only 2 percent of the respondents reported that the instruction was poor. These statistics suggest that the selection committee was very fortunate in their choice of Presessions to support.

In Table 2 are shown the responses to the question related to the desirability of including the attended Presession in the 1971 program. As can be seen, the participants are almost universally in agreement with the proposition to repeat the Presession attended. This is not too surprising since in every case, the topics and skills treated are of considerable value to educational research.

In Table 3 are shown the responses to the question related to the possibility of repeat attendance to the Presession attended. In this case 87 percent of the participants reported that they would be willing to repeat the training experience. This suggests that the presession programs were of considerable value to the participants and that the instruction was, indeed, of high quality.

Table 1. The Overall Quality of Instruction in Your Session Was: Excellent, Good, Average, Fair, or Poor.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Excellent	50	6	37	38	71	22	74	50	45	60	48
Good	41	53	45	29	26	50	19	46	42	40	39
Average	2	29	11	19	3	22	0	0	4	0	7
Fair	5	6	8	10	0	0	4	4	9	0	5
Poor	2	6	0	5	0	6	4	0	0	0	2
Total Number	44	17	38	21	38	18	27	28	55	20	306

Table 2. Leaving Aside the Quality of Instruction for the Moment, Do You Think the Topic Treated in Your Session Should be Included in Next Year's Presession Program: Yes or No.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Yes	100	100	100	95	100	89	100	96	100	100	99
No	0	0	0	5	0	11	0	4	0	0	1
Total Number	44	16	37	21	38	18	27	28	56	20	305

Table 3. If you had it to do Over Again, Would You Apply for the Session Which You Have Just Completed: Yes or No.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Yes	82	47	97	71	97	72	85	96	89	100	87
No	18	53	3	29	3	28	15	4	11	0	13
Total Number	44	17	38	21	38	18	27	28	56	20	307

Table 4. If This Same Session is Held Again, Would You Recommend That Other Attend: Yes or No.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Yes	96	77	97	86	100	83	96	96	93	95	94
No	4	23	3	14	0	17	4	4	7	5	6
Total Number	44	17	38	21	38	18	27	28	55	20	306

Table 5. Did You Stay at a Convention Hotel, At Home, With Friends or Relatives, or Other.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Hotel	82	94	79	86	71	61	82	82	76	95	80
Home	9	0	11	5	24	11	11	11	7	5	10
Friends	2	6	8	0	3	22	4	7	6	0	5
Other	7	0	2	9	2	6	3	0	11	0	5
Total Number	44	17	38	21	38	18	27	28	55	20	306

Table 4 shows the responses to the question related to whether a participant would recommend that others attend the presession if it were to be repeated. Again, there is an almost universal endorsement of the presession programs with 94 percnet of the participants indicating that they would recommend attendance by other researchers. A stronger endorsement of the program would be difficult to find.

On the basis of these four questions, it can be concluded that the 1970 program was a definite success. The great majority of respondents felt the instruction was of exceptional quality, that the programs should be repeated, that repeat attendance was not a bad idea, and they they would recommend that others attend. Finally, it should be noted that these high praises extend across all ten presessions.

The statistics reported in Table 5 concerning lodging during the Presessions shows that 80 percent of the participants stayed at a hotel in Minneapolis. Since 20 percent of the participants stayed at home or with relatives, the averages reported in Table 6 must be viewed with caution since they will underestimate the costs encountered by participants who came from areas outside of the St. Paul-Minneapolis metropolitan area. Excluding the information for Presession 9, which met in Chicago, it is seen that the average cost per participant ranged from a low of $154.28 to a high of $244.33. Of this amount, $99.03 to $202.59 was reimbursed, indicating that each participant had to spend about $40.00 to $60.00 of his own money to attend the presessions. For this reason, some thought might be given to the possibility of granting $50.00 to each participant to help pay the cost of attendance at future AERA Presessions.

The statistics reported in Table 7 show how important it is to advertise the presession program in journals other than the Educational Researcher. Approximately 41 percent of the participants learned of their Presession from other sources, with 22 percent reporting that they learned of the presession in other professional journals. Because of publication schedules, future directors should be urged to submit announcements to professional journals as soon as possible so that the participant base can be expanded.

According to the statistics reported in Table 8, about 88 percent of the participants thought that the presession attended was well scheduled and managed. Only two of the Presessions did not receive outstanding ratings on this dimension. Part of this poorer rating is most likely related to the content of the material and not to the inexperience or lack of interest on the part of the directors and teaching staff.

Table 6. How Much Money Did it Cost to Attend This Session? How Much of This Cost Will be Reimbursed to You?

Presession Number	Average Cost to Participant	Average Reimbursement to Participant	Total Number
1	$241.23	$186.34	44
2	226.76	151.98	17
3	203.79	131.67	38
4	215.43	105.23	22
5	154.28	99.03	39
6	219.17	111.94	18
7	244.33	202.59	27
8	206.11	162.22	28
9	166.84	107.96	57
10	202.50	187.50	20
			308

Table 7. Where Did You First Learn About the Training Sessions? Educational Researcher, Professional Journal, One Sheet Announcement, or Other.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Ed.Res.	57	77	32	71	73	39	70	41	63	70	58
Journal	25	23	16	24	16	33	19	26	23	20	22
One Sheet	2	0	24	0	3	17	0	4	2	5	6
Other	16	0	28	5	8	11	11	29	12	5	14
Total Number	44	17	38	21	37	18	27	27	56	20	305

Table 8. How Good Was the Scheduling and Management of the Presession You Attended: Very Good, Good, Poor, or Very Poor.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Very Good	41	18	63	38	82	33	85	46	32	80	52
Good	41	35	29	33	16	56	11	50	54	20	36
Poor	16	29	5	29	2	6	4	4	13	0	10
Very Poor	2	18	3	0	0	5	0	0	1	0	2
Total Number	44	17	38	21	38	18	27	28	56	20	307

As suggested by the statistics of Table 9, most participants were pleased with the meeting room facilities. The notable exception to this satisfaction was expressed by the participants in the Presession directed by Dr. Vandenberg. Among his participants, 67 percent thought that the facilities were poor or very poor. At the same time, 42 percent of the participants in the Presession directed by Dr. Ryan also expressed the same degree of dissatisfaction. In both cases, the dissatisfactions were justified. A number of avoidable complications developed at the hotel where these Presessions were being held. Poor records were maintained by the catering staff and there was an indication that the managers did not know that these Presessions were to be held at their hotels even though correspondence was exchanged with the directors and the logistic staff in Minneapolis. In both cases, meeting rooms were changed during the middle of the Presession and a number of other unnecessary and uncalled for interruptions were imposed upon the Presession by the management of the hotel.

Some of these same sorts of inconveniences were encountered by Dr. Yelon and Dr. Scott with respect to their Presession. However, their difficulties were minor when compared to those encountered by Dr. Ryan and Dr. Vandenberg. Finally, it should be noted that Presession 9, directed by Dr. Woodson, met at the University of Chicago Continuation Center. It appears that most participants were pleased with the facilities offered at the Center. This may suggest that future programs be considered for presentation at such centers. In general, they are more suited and better prepared for educational programs than are central city hotels.

According to the statistics reported in Table 10, about 20 percent of the participants thought that the prerequisite skills were higher than those possessed. This was especially true of Presession 9, directed by Dr. Woodson, and to a lesser degree of Presession 5, directed by Dr. Ward. This finding is not unexpected. Both of these Presessions assume a rather fundamental knowledge of statistical methodology and research sophistication. As will be seen, most of the participants felt that these topics are best covered in a longer presession and for that reason it might be reasonable to schedule sessions similar to these for one week instead of five days. It appears that if they were scheduled for a longer time period, educators and researchers would still attend so as to acquire the important skills taught in these sorts of Presessions.

Finally, it should be noted that 71 percent of the participants in Presession 2, directed by Dr. Pierce, reported that their prior knowledge was more than that necessary for the presession topic. This may explain

Table 9. How Good Were the Meeting Room Facilities for the Presession You Attended: Very Good, Good, Poor, Very Poor.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Very Good	9	47	8	14	45	0	0	4	47	10	21
Good	61	53	50	57	55	33	50	75	49	65	55
Poor	27	0	32	29	0	61	42	21	2	20	21
Very Poor	3	0	10	0	0	6	8	0	2	5	3
Total Number	44	17	38	21	38	18	26	28	55	20	305

Table 10. Do You Think You Had the Appropriate Prerequisites or Prior Knowledge to Make What You Learned at this Presession of Research, Teaching, or Administrative Value to You? More Than Necessary, Just the Right Amount, Not Enough.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
More Than Necessary	25	71	16	14	13	17	30	14	4	10	18
Right Amount	61	18	71	76	63	67	70	75	46	75	62
Not Enough	14	11	13	10	24	16	0	11	50	15	20
Total Number	44	17	38	21	38	18	27	28	54	20	305

the somewhat poorer, yet positive, showing given to this Presession on other questionnaire items. Essentially, this suggests that the Presession Selection Committee should guard against sponsoring programs that are not sufficiently advanced in materials to be covered and skills to be taught.

According to the statistics of Table 11, the interest and flexibility of the instructional staff of the various presessions to the variability in prior knowledge possessed by the participants was quite good and was positively noted by the participants. Only 4 percent of the participants stated that the staff hardly ever reacted to the variability in prior knowledge brought to the Presessions by the participants. The major exception of this evaluation was expressed by the participants in Presession 9, directed by Dr. Woodson. Of all the presessions given, it is this one that participants were least prepared for, and this is very unfortunate for the advancement of educational research. In many respects, this was one of the most important presessions ever offered by AERA mainly because so many problems of education are multivariate in nature. Very few schools of education offer any sort of training in this particular subject area because of the relatively high degree of statistical sophistication required for its understanding and use. Because it is new and generally difficult for most students, extreme flexibility is required on the part of the instructors. Therefore, if this program is offered again, as it should be, then special emphasis should be placed on achieving flexibility in the instructors so as to teach and communicate to the broadest group of participants possible.

As indicated by the statistics of Table 12, 87 percent of the participants reported that they had sufficient time to interact with the staff. However, there are two notable exceptions and these were Presessions 9 and 10, directed by Dr. Woodson and Drs. McSweeney and Penfield. For most of the participants, the subject matter of these Presessions was new and minimal familiarity was possessed by the participants. That they would have liked more interaction, more discussion, and more assistance from the teaching staff is not unexpected. For this reason, it is suggested that presessions of this nature be programed for one week instead of five days. This would give staff and participants sufficient time to discuss the lecture material and research problems of interest to the participants.

The importance of the presession subject matter to the participants is illustrated in Table 13. As can be seen, 73 percent reported that they would have liked to discuss their individual research problems

Table 11. Did the Teaching Staff Make Sufficient Allowance for the Variability in Prior Knowledge Brought to the Presessions by the Participants: Nearly All of the Time, Most of the Time, Some of the Time, Hardly Ever.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Nearly All the Time	25	18	35	33	26	39	33	25	6	35	25
Most of the Time	55	24	57	14	53	50	59	43	36	45	45
Some of the Time	18	47	8	43	21	0	7	29	53	10	25
Hardly Ever	2	11	0	10	0	11	1	3	5	10	5
Total Number	44	17	37	21	38	18	27	23	55	20	305

Table 12. Was There Sufficient Time for You to Interact with the Staff With Respect to Information and Knowledge Presented in the Presession: Yes or No.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Yes	96	100	87	95	97	94	100	89	58	75	87
No	4	0	13	5	3	6	0	11	42	25	13
Total Number	44	17	38	21	38	18	26	28	55	20	305

Table 13. Did You Wish to Discuss Research that Had Arisen in Your Own Work With Staff Members: Yes or No.

Response in %	Presession Number 1	2	3	4	5	6	7	8	9	10	Total
Yes	59	82	82	91	71	33	85	86	78	55	73
No	41	18	18	9	29	67	15	14	22	45	27
Total Number	44	17	38	21	38	18	26	28	55	20	305

Table 14. If Answer to Question in Table 12 was 'Yes,' Was There an Opportunity to Pursue This Interest: Quite a Lot, Some, or None at All.

Response in %	Presession Number 1	2	3	4	5	6	7	8	9	10	Total
Quite a Lot	39	36	52	53	52	67	64	46	21	18	43
Some	61	64	45	47	48	33	36	54	70	82	55
None at All	0	0	3	0	0	0	0	0	9	0	2
Total number	26	14	31	19	27	6	22	24	43	11	223

with the staff members. The only exception to this was Presession 6, directed by Dr. Vandenberg. This exception is not unusual since this particular Presession centered on imparting knowledge rather than improving the research skills of the participants.

Among the participants who wished to discuss research problems with the staff, almost all had the opportunity. As reported in Table 14, only 2 percent of the participants said that they had none at all.

As reported in Table 15, only 9 percent of the participants thought that the staff was unreasonable in the amount of work expected from the participants. This suggests that the directors gave special thought to what could reasonably be expected when teaching takes place in the non-ideal conditions that generally prevail in a hotel.

As indicated by the responses of Table 16, about 90 percent of the respondents see immediate usage or application of the materials learned at the presession attended. This same degree of usage is also indicated in Table 17, where it is seen that 98 percent report that they expect to use this new acquired skill at a later time.

The immense value of the presession selected for presentation to the participants is indicated in Table 18, since it is seen that 98 percent of the participants reported that they would like to learn more on the topic studied in the presession attended.

As reported in Table 19, only 37 percent of the participants thought that 5 days was sufficient time to learn and master the material of the presession attended. This was especially true for Presessions 5, 9, and 10 which were highly statistical in nature.

Among those respondents who felt that five days were not sufficient time for coverage of presession materials, 79 percent reported that they would attend a presession of seven days' length. In fact, as shown in Table 20, 42 percent reported that they would be willing to attend a two week presession.

In summary, it can be definitely concluded that the 1970 Presessions met the expectations of the participants. They reported that the instruction was excellent, there were opportunities of discussing research problems, and that the material learned would eventually make its way into their research. Finally, they reported that they would like to learn more about

Table 15. Did the Amount of Work Required by the Staff, of the Participants, Seem Acceptable: There was: Too Much, Just About Right, Too Little.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Too Much	7	0	8	0	16	6	4	0	19	15	9
Just Right	82	59	90	71	84	83	93	96	73	80	82
Too Little	11	41	2	29	0	11	3	4	8	5	9
Total Number	44	17	38	21	38	18	27	28	52	20	303

Table 16. Will You Use What You Have Learned in Your Own Teaching or Research in the Immediate Future: Yes or No.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Yes	96	88	95	95	84	89	93	96	76	100	90
No	4	12	5	5	16	11	7	4	24	0	10
Total Number	44	17	38	21	38	18	27	28	54	20	305

Table 17. Will You Use What You Have Learned at a Later Date in Future Research or Teaching: Yes or No.

	Presession Number										
Response in %	1	2	3	4	5	6	7	8	9	10	Total
Yes	100	94	97	95	100	94	96	100	98	100	98
No	0	6	3	5	0	6	4	0	2	0	2
Total Number	44	17	38	21	38	18	27	28	55	20	306

Table 18. Would You Like to Learn More on the Topic You Studied Here: Yes or No.

Response in %	Presession Number 1	2	3	4	5	6	7	8	9	10	Total
Yes	96	100	95	95	100	100	100	100	100	100	98
No	4	0	5	5	0	0	0	0	0	0	2
Total Number	44	17	38	21	38	18	26	28	55	20	305

Table 19. Was Five Days a Sufficient Time to Learn and Master the Material of Your Presession: Yes or No.

Response in %	Presession Number 1	2	3	4	5	6	7	8	9	10	Total
Yes	43	50	57	47	13	71	56	61	5	20	37
No	57	40	43	53	87	29	44	39	95	80	63
Total Number	44	16	37	19	38	17	27	28	56	20	302

Table 20. If Answer to Question in Table 19 Was 'No,' Would You Attend a Seven Day or Two Week Presession on the Same Material: No, Yes Seven Days, Yes Two Weeks.

Response in %	Presession Number 1	2	3	4	5	6	7	8	9	10	Total
No	21	38	25	44	16	0	0	14	19	35	21
Seven Days	54	25	31	22	38	80	58	57	25	29	37
Two Weeks	25	37	44	34	46	20	42	29	56	36	42
Total Number	24	8	16	9	32	5	12	7	52	17	182

the topics covered and that they would be quite willing to attend presessions that extended over one week. In essence, this suggests that the Presession Selection Committee should be congratulated for their final selection. Without doubt, the 1970 Presessions were well received by the educational and behavioral researchers who attended sessions in Minneapolis and in Chicago.

In the remainder of this report, descriptions of the 10 training sessions are presented with each of the following elements being included:

1. Title
2. Staff
3. General Description
4. Objectives
5. Schedule
6. Participants
7. Instructional and Evaluation Materials
8. Evaluation and Test Results
9. Director's Evaluation

These descriptions are drawn largely from reports supplied by the directors of the 10 sessions. Minor editing was undertaken to preserve some degree of uniformity in the reports.

TRAINING SESSION DESCRIPTIONS

PRESESSION I

1. Title: Survey Research in Education

2. Staff:

James G. Anderson (Director)	New Mexico State University
Harry R. Potter	Purdue University
Harlley E. McKean	New Mexico State University
Stanley Ball	New Mexico State University
Dean Nafziger	New Mexico State University

3. General Description:

Presession Number 1 was a special training session in Survey Research techniques aimed at demonstrating the use of the survey as a primary instrument for scientific study in education. The program was designed for those with little or no previous experience with Survey Research and covered all phases of Survey Research including, the design of a survey, sampling, construction of scales and indices, questionnaire construction, interviewing techniques, coding of data, and methods of analysis.

4. Objectives:

By completing a large number of class exercises with actual survey data collected by the participants on themselves, participants acquired a practical working knowledge of all aspects of survey research. As a result of attendance at this presession, participants should be able to:

1. Plan a survey in sufficient detail to answer questions regarding:

a. the objectives of the survey

b. the population to be studied

c. the means to be used in selecting a sample

d. the data that is to be collected

e. the methods to be used to collect these data

f. the approach to be used in recruiting, training, and supervising field workers

g. the methods to be used in editing, coding, and tabulating the survey data

h. the analytical techniques to be used

i. the reports that are to be prepared

j. the cost of the survey

k. the scheduling of the survey

2. Define the survey population, ascertain the necessary sample size to obtain the desired accuracy, choose a selection process, select a probability sample, and compute sample estimates of population values for relatively simple types of surveys.

3. Utilize certain scaling techniques such as the Likert scale, the method of equal appearing intervals, and Guttman scaling to develop scales and indices from survey data.

4. Design questionnaires and interview schedules.

5. Conduct interviews and train staff members to conduct interviews.

6. Recruit, train, and supervise staff for survey field work.

7. Edit, code, and process survey data in preparation for analysis.

8. Analyze survey data by utilizing a library of computer programs to:

a. examine the distribution of a single variable and its numerical properties

b. analyze the relationship between two qualitative variables by means of a cross-tabulation

c. compute selected measures of association between two variables

d. analyze the relationships among three or more variables by cross-tabulations

e. compute partial measures of association among three or more variables

f. perform correlation and multiple regression analysis.

5. Schedule:

A questionnaire was completed by each participant and coded on the morning of the first day of the training session in order to provide data for the class exercises. This was followed by a planning exercise in the afternoon. A review of statistics was held in the evening of the first day prior to the discussion and class exercises on sampling.

Sampling and measurement were treated on the second day. Participants worked through the first two exercises on sampling in order to gain familiarity with simple random sampling and cluster sampling. Data for these exercises were generated from decks of numbered cards that were provided each student.

Guttman scaling was used to initiate that part of the program dealing with measurement. After participants had scaled data from the code sheets using the Guttman technique, other types of scaling were discussed and illustrated.

The following methods of collecting survey data were discussed and illustrated on the third day of the session:

1. Use of archives
2. Direct observation
3. Questionnaires
4. Interviewing

The remainder of the third day and the fourth day were devoted to the analysis of survey data from the coding forms. Participants worked through and discussed the methodology involved in class exercises.

On the morning of the final day of the session a large number of graphical methods that can be used to display survey data were demonstrated. This was followed by a general review of the entire process of conducting a survey. Finally, participants were asked to complete the AERA evaluation form and to write down any comments, suggestions, or criticisms concerning the training session.

First Day: Morning:
1. Introduction to Survey Research
Administration and Coding of Class Questionnaire

Afternoon:
2 Planning Surveys
Survey Case Studies

Evening:
Review of Statistics or PERT

Second Day: Morning:
3. Sampling

Afternoon:
4. Measurement

Evening:
5. Data Collection
Questionnaire

Third Day: Morning:
5. Data Collection
Interviewing
5. Data Collection
Coding

Afternoon:
6. Data Analysis I
7. Data Analysis II

Evening:
7. Data Analysis II

Fourth Day: Morning:
8. Data Analysis III

Afternoon:
9. Data Analysis IV

Fifth Day: Morning:
Graphic Presentation of Survey Data
Evaluation of Training Session

6. Participants:

Of the 55 participants, 39, or 71 percent, were male. They came from 29 states with 47 percent coming from the Midwestern states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Ohio, and Wisconsin. There was one participant who came from California, while 5 of the participants were from Canada. Sixty-two percent of the participants were employed at a University

or College. The remaining 38 percent came from junior colleges, public school systems, state departments of education, or private corporations. Approximately one-third of the participants had attended other AERA Pre-session in previous years. Finally, 64 percent of the participants were holders of a doctorate.

7. Instructional and Evaluation Materials:

Each participant was provided with a notebook and a copy of Sociological Analaysis: An Empirical Approach Through Replication by Murray A. Straus and Joel I. Nelson (New York: Harper and Row, 1968).

As the Table of Contents from the notebook indicates, instruction and evaluation were broken down into ten sections. Data for the exercises were obtained by having each participant complete the questionnaire from Nelson and Straus. Participants then exchanged questionnaires and coded them on the coding form. The coding forms were collected and 20 sets of the 65 forms were reproduced so that a set was available for each group of three persons.

An optional session was held to review elementary statistics on the first evening of the session by Dr. McKean. The materials that he prepared for this review are contained in the Appendices, Section 10 of the notebook.

Notebook Contents:

1. Introduction

   A. Course Outline
   B. Survey Research in Education: The Case of a Misconstrued Technique by Sam D. Sieber

2. Planning Surveys

   A. Planning Surveys
      Exercise 1: Planning a Survey
   B. Scheduling Surveys-PERT
      Exercise 2: Scheduling a Survey

3. Sampling

   A. Sampling by Philip J. McCarthy
   B. Sampling
      Exercise 3: Simple Random Sampling
      Exercise 4. Stratified Sampling

4. Measurement

Scaling

Exercise 5: Measurement of Socio-Economic Status
Exercise 6: Social D istance Scale
Exercise 7: The Method of Equal-Appearing Intervals
Exercise 8: Guttman Scaling

5. Data Collection

A. Questionnaire
Exercise 9: Class Questionnaire
B. Questionnaire Construction
Exercise 10: Planning a Survey
Exercise 11: Design of a Questionnaire
Exercise 12: Administering a Questionnaire
C. Interview Schedule
D. The Questionnaire and the Interview
E. Interview Schedule Construction
Exercise 13: Planning a Survey
Exercise 14: Design of an Interview Schedule
Exercise 15: Interviewing
F. The Observation and Recording of Behavior
Exercise 16: The Observation and Recording of Behavior
G. Coding Instructions: What People Like and Dislike About the Schools
H. Coding and Tabulation of Survey Data
Exercise 17: Coding and INdex Construction
Exercise 18: Development of Codes from Empirical Data
Exercise 19: Coding Data for Transfer to Punched Cards
Exercise 20: Planning for the Tabulation of Survey Data

6. Data Analysis I

Description and Summary of Single Variables
Exercise 21: The use of Percentages
Exercise 22: The Use of Means
Exercise 23: The Use of Percentages

7. Data Analysis II

Relationships Between TWo Variables: The Use of Percentages
Exercise 24: The Use of Percentages
Exercise 25: The Use of Percentages
Exercise 26: The Use of Means

8. Data Analysis III

Relationships Between Two Variables: Measures of Association

Exercise 27:	The Percentage Difference
Exercise 28:	Chi Square
Exercise 29:	Gamma
Exercise 30:	Product Moment Correlation
Exercise 31:	Partitioning the Degrees of Freedom in Contingency Tables
Exercise 32:	Testing for Trends in Contingency Tables

9. Data Analysis IV

Multivariate Analysis: Relationships Among Several Variables

Exercise 33:	The Use of Percentages
Exercise 34:	The Use of Percentages
Exercise 35:	Gamma
Exercise 36:	Product Moment Correlation
Exercise 37:	The Use of Means
Exercise 38:	Multiple Regression Analysis

10. Appendices

A. Review of Elementary Statistics
B. Tables
C. Research Design and Analysis in the Behavioral Sciences: An Annotated Bibliography by James G. Anderson

8. Evaluation:

Participant evaluation was based upon the completion of 38 different class exercises. The proportion of students who completed each exercise is shown in the following table:

Exercise	Subject	% completing
1	Planning a survey	100%
2	Scheduling a survey**	40
3	Simple Random Sampling	100
4	Stratified Random Sampling	100
5	Measurement of socioeconomic status	100
6	Social distance scale	100
7	Method of equal appearing intervals	100
8	Guttman scaling	100
9	Class questionnaire	100
10	Planning a survey	NA
11	Design of a questionnaire	100
12	Administering a questionnaire	NA
13	Planning a survey	NA
14	Design of an interview schedule	100
15	Interviewing	NA

Exercise	Subject	% completing
16	The observation and recording of behavior	NA
17	Coding and index construction	100%
18	Development of codes from empirical data	100
19	Coding data for transfer to cards	NA
20	Planning tabulation of data	NA
21	Use of Percentages	100
22	Use of Means	100
23	Use of Percentages	100
24	Use of Percentages	100
25	Use of Percentages	100
26	Use of Means	100
27	Percentage difference	NA
28	Chi Square	100
29	Gamma	100
30	Product Moment Correlation	NA
31	Partitioning Degrees of Freedom	NA
32	Testing for Trends	NA
33	Use of Percentages	NA
34	Use of Percentages	100
35	Gamma	NA
36	Product Moment Correlation	NA
37	Use of Means	NA
38	Multiple Regression Analysis	NA
	Review of Statistics**	
1	Descriptive Statistics	50
2	Random Variables	50
3	Hypothesis Testing	50
4	Comparing Two Means	50
5	Use of Chi Square	50
6	Uses of the F Distribution	50

**Optional Exercise
NA Exercise not assigned

9. Director's Evaluation:

In all, 73 persons applied and were accepted for Presession 1. Of these applicants only one-third had participated in a previous AERA sponsored Research Training Program. The large number of first-time applicants for this training session would suggest that many persons involved in teaching and performing educational research desire an opportunity to learn about survey research methodology, and were not exposed to these techniques during their academic training.

This is borne out by analysis of the backgrounds of the 55 men and women who participated inthe session.

Two-thirds of the participants hold the doctorate. The median number of courses in statistics and experimental design completed by these individuals is between 3 and 4. However, almost all of the applicants mentioned their lack of formal training in survey research methodology and their increased involvement with research and educational policy problems requiring survey techniques as the major reason for applying for this session. It would appear that most participants followed a traditional academic program in which they were exposed to several courses in statistics and experimental design with little or no exposure to survey research methodology.

The hotel setting for these presessions, I must say, leaves a great deal to be desired. The Leamington over-scheduled events for their existing facilities necessitating a good deal of shifting from room to room the first two days. Also there were major problems of security in such a setting due to the personal belongings that had to be carried by participants during the meal breaks, etc. Finally, the difficulties of finding reasonable restaurants, close to the hotel where participants can be served promptly played havoc with the schedule at times.

A university campus or center, such as the Center for Adult Education at the University of Maryland, provided a fine setting for the post sessions last year. Moreover, the staff of such centers provide excellent support both prior to and during the sessions. Having a University handle registration and logistics as well as the avialability of AV equipment, duplication facilities, seminar rooms for group work, etc., has much to recommend it for the future Research Training Sessions.

The session itself went quite well, in my estimation. We accomplished a great deal of what we had intended to accomplish. However, several of the participants' suggestions that were outlined earlier are important for future training sessions based on this topic. For example, making available a computer terminal for the session next time would serve to introduce participants to the very important technical aspects of processing survey data. At the same time use of such a terminal would cut down on the tedious and time consuming clerical operations and calculations that are necessary when analyzing data. We had planned to use a terminal this year, but the hotel setting made it virtually impossible to do so.

Although we did attempt to differentiate the program to suit the interests and level of participants where ever possible, such differentiation might easily be incorporated into the program and notebook from the very beginning by providing a series of optional and

supplementary exercises for participants who wish to pursue special topics and/or more sophisticated research methodologies such as the use of multivariate statistical techniques in the analysis of survey data and a variety of sophisticated scaling techniques such as factor analysis, etc. Additional material on a wider variety of data collection techniques could easily be included in the notebook. In this fashion groups of participants could easily simultaneously work on different exercises aimed at different levels but all are related to the same central topic. Also, with as large a group of partcipants as we had both the times the training sessions has been offered, it would be wise to add additional staff next year in order to provide for more individual assistance. Again, a number of participants mentioned this in their comments and suggestions.

In summary, I believe that the Research Training Session on Survey Research proved to be most popular and successful and should be offered again next year. In fact, the persons who applied for this session last year and this year but who did not attend for a variety of reasons may well welcome an opportunity to participate the next time that the topic is offered if their expressions of regret at not being able to attend are any indication.

PRESESSION II

1. Title: A Social Systems-Field Studies Paradigm for Research on Organizational and Administrative Phenomena in Education

2. Staff:

Douglas R. Pierce (Director)	California State Polytechnic College
Dan Lortie	University of Chicago
Erwin Miklos	University of Alberta
Philip Runkel	University of Oregon
James D. Thompson	Vanderbilt University

3. General Description:

Increasing attention has been directed in recent years to the development of social systems conceptualizations, their utility in generating understanding of school organizations, and to methodological implications of attempting to understand schools as social systems. A primary purpose of this presession was to increase social systems-field studies paradigm consensus; that is, to increase the liklihood that participants would respond in social systems-field studies terms to basic questions: What are the important questions about the structure and processes of organizational behavior in education? What are the effective ways of finding answers to those questions? What are satisfactory criteria for acceptance of the answers? Content was concerned with such questions as the following: What are the properties and relationships which are considered critical in social systems theories? What distinctive properties and relationships are observeable in school organizations? What are some of the research techniques being utilized in studies of schools as social systems? What answers are resulting from such studies? What are the critical issues raised by approaching schools as social systems, susceptible to understanding and to development through field studies techniques?

4. Objectives:

The major objective was to increase participants' abilities to design and implement social systems-field studies of school organizations. Participation in the presession was expected to increase the likelihood of:

1. Asking researchable questions for which at least partial answers could be anticipated through

social systems theory, and for which the answers could be expected to be important in developing a comprehensive understanding of school organizations.

2. Designing and implementing field studies of school organizations, such studies to include comparative and multivariate designs and to utilize multiple observational systems.

3. Increased grappling with critical issues of the interaction of theory and technique, standards for judging the adequacy of research answers; further, increased interaction and communication with colleagues both about such issues and about studies in which they become involved.

5. Schedule:

First Day: Session 1:
Orientation: statement of objectives, introduction of staff with identification of their special competencies and interests, small group introduction of participants-large group summation

Session 2:
Systems theory in organizational research, traditional preoccupation with core technology/closed system tradition in administration studies; scale expansion, increased technological complexity, and task environment redefinition; interdependence and contingency; systems transactions; inducements-contributions model; predictions as to directions of organizational growth and compensations for necessity of dealing with uncertainty

Session 3:
Inventory of research activities underway or being designed by participants: formation of research design sub-groups

Second Day: Session 1:
Techniques for developing and understanding organizational problem-solving in a school faculty: intervention as field experimentation; reactivity in data gathering; multiple observational techniques

Session 2:
Research design activity in sub-groups: issues of macro and micro orientation; development of problem statements; speci-

fication of methodological issues; large-group summation and feedback

Third Day: Session 1:
Realistic working models of school organizations: specification of distinctive properties and relationships of school organizations; utility of an 'as if' perspective in research design; essentialness of comparative design in field studies

Session 2:
Development of research studies in subgroups: focus upon problems of sampling in field studies, data collection techniques, presentations on interviewing, participant observation, and reports of research on elementary school teachers

Fourth Day: Session 1:
Strategies for getting on; organizing ideas about organizations to increase the likelihood of their utilization in field studies of school organizations: inputs, transformations, outputs and feedback; boundaries and environmental variables; vertical and lateral differentiation

Session 2:
Critique of research on schools in the bureaucratic tradition; specification and illustration of five specific alternatives for guiding research. Criterion problems in field studies of school organizations. Hypotheses about organizational transformation, domain expansion and task environment expansion, and increasing frequency of intensive technology organizations

Fifth Day: Session 1:
Challenges of an open systems orientation for research on schools: multiplication of value issues, informational demands, interdependencies; non-zero-sum alternatives; incremental problem solving processes; transformation of 'norms of rationality' toward 'Parento Optimum;' redefinition of coordination; 'muddling through' strategies/development of collegiums; intervention strategies for development and research; appropriateness of schools for intervention and transformation toward intensive technology model

Session 2:
Critique of social systems conceptualization as grounding for research design and of field study techniques for developmental and for research effectiveness; planning for carrying forward work on field studies instigated during the presession; critique of presession activity and immediate outcomes

6. Participants:

The age of the thirty participants ranged from 29 to 55, with the average age being 38.7. Twelve participants were older than forty, and of those, five were 50 or more years of age; six participants were younger than 35, with twelve between 35 and 40 years of age. Only one of the participants was female. Most participants (23 out of 30, or 77 percent) had not previously attended an AERA presession.

Twenty-three participants (77 percent) were from a college or university. Regional Education Laboratories contributed three persons, and a state education department, a city mental hygiene clinic, and a professional association each contributed one person. Most participants (19) were from the midwestern portion of the nation. However, 7 were from the southern portion, 5 were from the eastern portion, 3 from the western portion, and 1 was from Canada.

Eighty percent of the participants held the doctorate; the balance were candidates for the doctorate. Major fields of study were diversified: 47 percent listed educational administration, 27 percent listed psychology (five educational psychology, and one each in social psychology and general psychology), 10 percent listed sociology (including sociology of education), and the balance were distributed among educational research, teacher preparation, and international education. The average number of articles reported was 7.4, with two persons reporting more than 30, and two reporting none. The average of funded projects was .8, with sixteen persons reporting no funded projects.

In response on a seven-point scale to the question, "How knowledgeable are you of social systems concepts?" the mean response was 3.8 for the 23 participants who responded to the survey prior to arrival. Similarly, the mean response was 3.4 to the question, "How knowledgeable are you of field studies techniques?" For both items, responses clustered near the extremes of the scale; participants tended to report being either 'naive' or relatively 'sophisticated' rather

than being moderately knowledgeable. An inventory of authors or titles read pertinent to social systems concepts and to field studies techniques yielded highly diversified listings.

7. Instructional and Evaluation Materials:

Instructional and reference materials were distributed both by mailings prior to the presession and during the presession. Some were of a general nature (e.g., a monograph by Richard Schmuck and Philip Runkel, Organizational Training for a School Faculty) and others were specific to a staff presentation (e.g., 'Organizational Structure and Teacher Behavior' by Philip Runkel). Several basic reference books were maintained on hand during the presession.

8. Evaluation:

Verbal feedback was elicited in informal individual and small-group conferences during the last day of the presession; written observations or critiques were submitted by 30 percent of the participants following the presession. Representative observations were as follows with both an unenthusiastic and an enthusiastic comment being given:

1. Format of the presession: 'Lack of structure was a serious problem. We needed a tighter structure imposed upon us.' 'The flexibility of the staff enabled us to modify the presession to fit our highly varied wants and needs.'

2. Content: 'Too little input from the staff, and too elementary in nature. We should have gotten more from the staff.' 'I'm going away with a different perspective on how to go about research. I have clearer ideas about critical contingencies in overcoming a sense of marginality in the Southern black student, and enough encouragement to enable me to proceed to intervene in a way that should be effective for helping change the whole system. And we should learn some important things in the process.'

3. Utility/Value: 'The session was a good excuse for getting away from back-home pressures for a few days.' 'I found the kind of ideas and support that I needed.'

9. Director's Evaluation:

My judgement is that the presession was of high value only for a few participants, of moderate value for the majority of participants, and disappointing to several participants. Participation in the session

did not provide much opportunity for development of immediate operational capabilities. However, pay-offs are more likely to occur over time in the design and implementation of field studies open to the complexities and inter-relatedness of school organizations.

Diversity of participants' backgrounds and wants presented problems never satisfactorily resolved during the presession. Attempts to respond to the diversity contributed to lack of continuity and looseness in the presession format. In retrospect, a more effective response would have been adherence to the initial schedule. In attempting to be responsive, losses occurred in amount of content transmittal and in discontinuities in the development of related concepts and techniques.

The staff was eminently qualified, including diverse but complementary competencies. However, lack of prior experience in working together (even in all members knowing one another), without opportunity to convene prior to the evening before the presession commenced, inhibited planning and preparation: uncertainty about instructional styles as well as critical value orientations prevailed until the staff actually had begun the presession instruction. Instructional presentations had been carefully prepared. Further, all staff members were present for all sessions, and engaged in a continuing dialogue regarding the ideas under consideration. Individual and informal small group meetings occurred between the staff members and participants throughout the presession. The presession clearly was a positive, rewarding experience for all members of the staff; their commitment and involvement was evident throughout the sessions.

Social systems conceptualizations and field studies techniques, with reference to school organizations in particular, are emerging as important if yet uncertain approaches for gaining understanding of educational organizations. Development of the approaches probably would be more effective, however, given a more limited focus than attempted in this presession.

PRESESSION III

1. Title: Systems Techniques in Counselor Education and Counseling Program Research

2. Staff:

T. A. Ryan (Director)	University of Hawaii
Ray E. Hosford	University of California, Santa Barbara
Leonard C. Silvern	Education and Training Consultants Co., Los Angeles
Norman R. Stewart	Michigan State University
Carl E. Thoresen	Stanford University
Bob B. Winborn	Michigan State University

3. General Description:

The need for improvement and innovation in counseling, counselor education and related areas has intensified as social, political, and economic factors have created new problems and greater challenges for the educational community. With the adoption of standards for counselors and counselor educators the need for research skills was intensified. The standards carry an implicit mandate to the profession to make a searching analysis of goals and study of the ways in which to achieve goals most effectively. The research training session was designed to equip selected personnel with the research skills needed to implement needed innovations and improvement in the field.

Counseling, counselor education, and related educational programs can be conceptualized as systems. Therefore, it can be assumed that improvement in counseling, counselor education, and related educational programs can be achieved through application of techniques of systems research to these areas of educational endeavors.

In counseling, counselor education, and related areas there are needs to investigate problems and to arrive at best possible solutions to these problems. The systems research techniques of analysis, synthesis, modelling, and simulation can be employed to meet these needs.

The acquisition of proficiency in using systems techniques can be accomplished in a short-term training session.

4. Objectives:

The purpose of the presession was to develop and improve research competencies of counseling specialists, counselor educators, supervisors, educational psychologists, and researchers performing substantive research in counseling, counselor education or related areas. The program aimed to help participants acquire understanding of concepts, principles, and technologies of systems research and to become skilled in use of systems techniques.

The two primary aims implementing the program purpose were development of participants' knowledge and understanding of systems research concepts and principles; and development of participants' proficiency in using systems techniques.

Objectives implementing the presession were:

1. For participants to demonstrate on an objective test understanding of concepts, including system, feedback, analysis, synthesis, and simulation.

2. For particpants to demonstrate on an objective test understanding of principles, including feedback, closed loop, coding, lettering, signal paths, descriptors, F, FF, A, and error signals.

3. For participants to demonstrate ability to convert a narrative problem description into a flowchart model, with correct element identification and use of flowchart symbols.

4. For participants to demonstrate ability to convert a flowchart model into narrative form.

5. For participants to demonstrate ability to define behavioral objectives.

5. Schedule:

First Day: Morning:
Opening Pre-assessment, introductions, and overview. Behavioral goals, model for producing a system, discussion, and LOGOS language for flowchard modeling.

Afternoon:
Systems engineering of learning, systems including synthesis and CAI, definitions of system and counseling system. Systems using feedback.

Second Day: Morning:
Problem: SATELLITE, and evaluation of problem solutions. Model for producing a system model, study closed loop instructional flowchart model: Boeing.

Afternoon:
Analysis as a process, synthesis as a process. Problem guidance management.

Third Day: Morning:
Closed loop instructional flowchart model: Occupational instruction and government based information. Problems and evaluation of solutions.

Afternoon:
Non-math counseling problem. Mathematical modeling: Anasynthesis, analysis, synthesis, modeling, simulation. Modeling and simulation: Algebraic solution, probabilistic solution, and on-line computer simulation.

Fourth Day: Morning:
Evaluation of counseling problem solutions. Post-assessment. Generation of real life problem.

Afternoon:
Problems

Fifth Day: Morning:
Evaluation of real life problem solutions. Program evaluation. A counseling model.

Afternoon:
Model for a district testing program. Model for the school counselor and negotiations. Counselor education model.

6. Participants:

Participants came from eighteen states, the District of Columbia and Canada, ranged from 27 to 53 years of age, included 40 males and five females and represented higher education, local school districts, private schools, business, industry, and government agencies. Out of 45 participants, 41 held the doctoral degree. Distribution of participants by sex, age, highest educational degree, place and nature of employment is given in the following table.

Participant Characteristics

Sex	Number	Education	Number	Age	Years
Male	40	Ph.D.	41	Range	27-53
Female	5	M.A.	4	$\bar{X}$	40.26

Nature of Employment

Employer	Position	Number
Higher Education		
	Asst. Professor	10
	Assoc. Professor	7
	Professor	5
	Coordinator	3
	Director	7
	Chairman	3
	Counseling Psychologist	1
Public School		
	Director	3
	Research Associate	1
	Supervisor	1
Industry		
	Director, Program Design	2
	Behavioral Scientist	1
	Consultant	1
		45

7. Instructional and Evaluation Materials:

The program of instruction in the presession assumes a prior understanding of certain basic concepts and principles, and ability to perform certain activities with ease and competence. In order to derive maximum benefit from the training program, participants must have a thorough understanding of the language of system research, and must be able to operationalize mission goals and to define behavioral objectives. It is assumed that before the presession begins participants will be capable of defining problems, stating objectives in behavioral terms, and identifying alternatives to implement the objectives. The references listed are intended to provide a means by which participants can acquire the prerequisite knowledge and skills which are assumed for this program. Reference annotations are

provided to assist in directing reading activities so that optimum use can be made of participants' reading time prior to the start of the presession.

Banathy, B. Instructional systems. Palo Alto, California: Fearon, 1968. A good overview of systems approach. Easy reading. Should be studied by everyone to insure thorough understanding of the nature of systems research. The appendix is particularly good.

Boguslaw, R. The new utopians: A study of system design and social change. Englewood Cliffs, N. J.: Prentice-Hall, 1965. An overview of systems approach. Intermediate reading level.

Buckley, W. (Ed.) Modern systems research for behavioral scientists. Chicago: Aldine Publishing Co., 1968. A collection of articles dealing with systems theory. Advanced reading.

Carter, L. F. Systems approach to education: Mystique or reality. Educational Technology, 1969, 9, 22-31. Gives an overview of the systems approach, with discussion of pros and cons from using the systems techniques.

Churchman, C. W. The systems approach. New York: Delacorte Press, 1968. This brief discussion of systems approach gives an excellent overview of the total systems concept, which involves problem identification, objectives definition, alternatives, identification and evaluation. This reference helps to point up the way in which flowchart modeling and simulation techniques implement the systems concept. Should be studied by all participants.

Cooley, W. W. and Hummel, R. C. Systems approaches in guidance. Review of Educational Research, 1969, 39, 351-362. Relates systems techniques to guidance. Easy reading.

Educational Technology, 1969, 9, No. 3, 1-77. This special issue of Educational Technology is devoted to counseling technology.

Eraut, M. R. An instructional systems approach to course development. AV Communication Review, 1967, 15, 92-101. Relates the techniques of systems research to course development.

Gagné, R. M. Educational objectives and human performance. In Krumholtz, J. D. (Ed.), Learning and the educational process. Chicago: Rand McNally, 1965. pp. 1-24. Discusses definition of objectives. Easy reading.

Mager, R. F. Preparing instructional objectives. Palo Alto, California: Fearon, 1962. This book tells how to prepare behavioral objectives. It is mandatory that each participant be able to define objectives in behavioral terms. The principles discussed in this reference must be thoroughly understood by each participant. Each participant must be able to demonstrate proficiency in defining objectives behaviorally. This can be accomplished by concentrated study of this reference, and practice in preparing behavioral objectives. Should be studied carefully by all participants.

Ryan, T. A. Systems techniques for programs of counseling and counselor education. In Silvern, L. C. (Ed.) Applying systems engineering techniques to education and training. Educational Technology, 1969, 9, 1-17. This article describes the application of systems techniques in counseling and counselor education. It provides a frame of reference for the presession. Easy reading. Excellent bibliography on systems research. Should be read by all participants. The other articles in this issue are relevant to the presession topic. Casual reading is recommended.

Silvern, L. C. Systems engineering of education I: The evolution of systems thinking in education. Los Angeles: Education and Training Consultants, 1968. This is the basic text for the course. Pages 111-129 should be studied carefully by all participants. The program assumes that participants will have read this material and have a thorough understanding of the concepts presented in these pages.

Silvern. L. C. LOGOS: A system language for flowchart modeling. In Silvern, L. C. (Ed.), Applying systems engineering techniques to education and training. Educational Technology, 1969, 9, 18-23. Contains basic vocabulary for flowchart modeling. Should be studied by all participants.

Thoresen, C. E. The systems approach and counselor education: Basic features and implication. Counselor Education and Supervision, 1969. Discusses the application of systems techniques to counselor education.

von Bertalanffy, L. Modern systems theory. New York: George Braziller, Inc., 1968. Deals with systems theory. Advanced reading.

Wiener, N. Cybernetics. Cambridge, Mass.: Massachusetts Institute of Technology Press, 1961. Deals with cybernetics aspect of systems research. Advanced reading.

Wiener, N. Human use of human beings, New York: Doubleday, 1954. Deals with cybernetics in relation to systems approach to research. Advanced reading.

8. Evaluation and Test Results:

Two measures were taken to evaluate participant performance against program aims: an objective pre- and post-test, and self evaluation by participants.

Evaluation of the presession in terms of participant achievement training objectives was accomplished by comparing pre and post instructional performances on a test intended to sample behaviors implementing program aims. The same instrument, which was administered for pre and post instruction testing, contained two subtests, both of which were intended to sample behaviors relating to Aim 1, understanding of concepts and principles of systems research. Subtest 1 was concerned with basic concepts of systems research, excluding the concept of behavioral objectives. Subtest 2 was concerned only with understanding of behavioral objectives.

The median scores on both subtests for the posttest administration were roughly double the pre test median scores, as indicated by the increase from 23 to 50 on subtest 1, and 6 to 10 on subtest 2.

Acceptable performance criteria were defined for Aim 1, developing understanding of systems concepts and principles. The levels of an acceptable performance on Subtests 1 and 2 and the percent of participants meeting criterion levels on pre and post tests reveals that 86 percent of participants reached criterion level on the post test, compared to 9 percent on pretest for understanding of systems concepts exclusive of behavioral objectives. On the post test 52 percent of participants reached criterion level for understanding of behavioral objectives, compared to 24 percent on pretest.

No immediate objective test was taken to sample behaviors relating to Aim 2, participant proficiency in applying systems techniques. A follow-up is planned to evaluate the progrm against this objective.

Self-evaluations against Aims 1 and 2 were taken by eliciting from participants responses to indicate how participants felt about progress they made toward training objectives.

Ninety-eight percent of participants felt the program resulted in their acquisition of knowledge about systems research, and 95 percent felt the program increased proficiency in using system techniques.

9. Director's Evaluation:

A program evaluation was made to determine the extent to which program components contributed to effectiveness of the presession. Data were gathered to evaluate learning activities, instructional materials, program content, and program organization.

Participants rated program learning activities on a four-point scale to indicate degree to which the activity contributed to achievement of program objectives. Mean ratings reveal that all activities were rated above the mean expected by chance. The activity deemed most worthwhile was the audio-visual presentation, with lectures and work on real life problems rated next in importance. General discussion was rated lowest.

Evaluation of instructional materials was made by participant rating on a four-point scale of six references which were required for the program. Mean ratings reveal that all references were rated above the chance mean. The reference rated as most worthwhile was LOGOS: A system language for flowchart modeling, by L. C. Silvern, with the next highest rating for Systems techniques for programs of counseling and counselor education by T. A. Ryan.

Program content was evaluated by participant rating on a four-point scale of each program unit in terms of contribution to program aims. Mean ratings reveal that units considered most valuable were Problem from Real-Life Environment, Conceptual Analysis and Synthesis, and Rules and Symbols for Flowchart Modeling. The unit rated lowest was the Counselor Education Problem. All units were rated above the chance mean.

Program Management was evaluated by participant ratings of aspects of program organization and management relating to information, meals and lodging, staff qualifications, time utilization, and climate for learning. Participant ratings of program management indicate general satisfaction with program information, meals and lodging, staff competencies, and climate for learning. The physical facilities were not considered satisfactory. There was no consensus with regard to time, with one-fifth to one-fourth of the participants expressing the opinion that time was not sufficient.

PRESESSION IV

1. Title: Research and the Development of Instructional Theory

2. Staff:

Thomas J. Shuell (Director)	State University of New York at Buffalo
Joe L. Byers	Michigan State University
Frank H. Farley	University of Wisconsin
S. Jay Samuels	University of Minnesota
Fred Linder	State University of New York at Buffalo

3. General Description:

The main emphasis of this presession was directed toward the acquisition of the knowledge and skills necessary for conducting research on the psychology of instruction and for developing a viable theory of instruction. Particular emphasis was placed on the ability to ask relevant questions concerning the process of learning and instruction. Various theoretical approaches to the study of instruction were considered, and selected research on human learning and instruction was presented and discussed. An attempt was made to integrate present-day knowledge and to outline some directions which future research on the psychology of instruction might take.

Each participant was asked to state a potentially researchable question dealing with the psychology of instruction. These questions were then discussed critically by the staff and the other participants in small group discussion, and each participant then developed an experimental study that would help answer his question.

While much of the instruction of the presession was lecture/discussion, ample time was provided for the participants to interact with the staff and with one another through daily discussion periods.

4. Objectives:

The primary objective of the presession was to encourage research and theory development in the psychology of instruction by providing the participants with the necessary training for pursuing such endeavors. More specifically, the things which it was hoped that the participants would be able to do at the completion of the presession included the following:

1. Ask amenable questions pertaining to the psychology of instruction.

2. Outline a study which would provide an adequate test of one of the above questions.

3. Identify relevant and irrelevant variables in the investigation of the psychology of instruction.

4. Differentiate between learning and instruction.

5. Distinguish between the psychology and the philosophy of instruction.

6. Distinguish between questions concerning what is unknown about the process of learning and/or instruction and the application of present-day knowledge to the solution of practical problems.

7. Differentiate between research and development and describe how the two interact.

8. Describe the main characteristics of various approaches, i.e., theories, models, etc., to the study of instruction.

9. Describe some of the ways in which instruction can be adapted to meet various individual differences.

10. Differentiate between cognitive and affective factors in learning and instruction.

5. Schedule:

First Day: Morning:
Discussion of presession objectives. The psychology of learning and the psychology of instruction. Some theories and models of the instructional process.

Afternoon:
Research and development in education. Review of some aspects of scientific research and the role of theory and/or models including a consideration of the interaction between theory, data, and methodology. The asking of relevant questions. Panel discussion by staff of day's presentation beginning with short summary. During the discussion it is hoped that each staff member's orientation will become apparent.

Second Day: Morning:
Some methodological considerations in instructional research. Attention in learning. Attention and its role in instruction. Motivational and affective factors in learning and instruction: Some issues in current research.

Afternoon:
Motivation and attention: A consideration of methodology, technology, etc., and some directions for the future research. Individual differences in learning and instruction. Small group discussions centered around interests and problems of participants. Individual consultations with staff members.

Third Day: Morning:
Individual differences by instruction interaction: Some current research. The process of reading acquisition: Learning models and some current research.

Afternoon:
Behavior management and its implication for instructional theory. Critique of participants' questions in small group discussions.

Fourth Day: Morning:
The process of reading acquisition: Implications for instructional theory and areas of needed research. Learning from written materials: Current issues and research.

Afternoon:
Learning from written materials: Programmed instruction, and implications for future research. Individual consultations with staff. Critique of participants' questions and proposed research in small group discussions.

Fifth Day: Morning:
Concept learning and instruction: Some implications for instructional theory and future research. Small group discussions.

Afternoon:
Critique and discussion of participants' questions and research proposals--small group discussions and/or individual consultation with staff.

6. Participants:

Thirty participants from the United States and Canada attended the presession. Nineteen (63 percent) of the participants hold academic appointments in universities and colleges, and 4 (13 percent) of the participants are employed by either a regional laboratory or an R & D center. Fourteen (47 percent) of the participants had attended a previous presession. Doctoral degrees were held by 25 (83 percent) of the participants. The participants had published an average of 3.57 research articles in scholarly journals. Sixteen (53 percent) of the participants indicated that they had been a director or co-director of at least one research project funded by a granting agency such as USOE, NIMH, etc.

7. Instructional Material:

Handout materials were prepared by the staff and used during the presession.

8. Evaluation:

A questionnaire designed for this presession only was mailed to the 30 participants approximately two weeks after the end of the presession. The questionnaire consisted of 10 rating-type items and four open-response items. Response to the questionnaire was anonymous. Twenty-two individuals returned the questionnaire, and the results for these respondents are presented below:

1. Do you feel that the objectives of the presession were met?

Definitely (32%), Somewhat (50%), No (9%) Undecided (9%)

2. Were <u>your</u> objectives for coming to the presession met?

Definitely (36%) Somewhat (41%) No (18%) Undecided (5%)

3. Do you feel that you will use what you have learned in this presession in your future work?

Definitely (68%) Probably (23) No (5) Undecided (4%)

4. Was the presession staff sufficiently available for consultation on individual questions and problems?

Definitely (82%)Somewhat (14%) No (4%) Undecided (0)

5. Was there sufficient opportunity for interaction with the staff and other participants?

Definitely (68%) Somewhat (18%) No (5%) Undecided (5%)

6. Was the pacing of the material:

About right (77%)Too Fast (5%) Too Slow (9%)
Undecided (9%)

7. Was the level of difficulty of the material:

About Right (59%) Too Difficult (0) Too Easy (27%)
Undecided (9%)

8. Was the coverage of present research and theory adequate?

Definitely (32%) Somewhat (36%) No (18%) Undecided (14%)

9. Were the implications for future research sufficiently emphasized?

Definitely (41%) Somewhat (27%) No (27%) Undecided (0)

10. Do you feel that this presession should be offered again?

Definitely (77%) Possibly (14%) No (5%) Undecided (5%)

The questionnaire included open-ended items asking the participants for specific comments and suggestions. However, it is somewhat difficult to summarize these comments in any systematic or meaningful way. In many respects the comments seem to deal with individual preferences and interests. The diversity of interests, expectations, and preferred mode of instruction among the participants is quite clear from the comments. For example, the attempt to get each participant to ask a relevant and researchable question concerning the psychology of instruction and to develop a research design for testing the question drew the following two comments: 'More time on staff presentations, less time on development of research projects. Project was a kid-stuff assignment.' 'The small group discussions of individual members' research proposals were excellent. To be repeated in the future, by all means!'

In responding to an item on the special questionnaire which asked those who felt that their objectives for the presession had not been satisfied to list their objectives which they felt were not adequately met, five individuals indicated that they had wanted more emphasis on the nature of theory and various

aspects of theory development. A number of individuals said that they thought the presession could have been better organized.

In addition, several individuals made suggestions which I feel are particularly useful ways in which the presession could have been improved. One person suggested that the small group discussions center around the interests of the participants rather than the interests and competencies of the staff. While no suggestion was made as to how this could be accomplished within the limitations of staff availability, it is possible that a staff member might not be required in each group. Another individual suggested that staff consultation time and study time be placed in the middle of the daily schedule so that the individuals would not be too tired or drift away as was the tendency when this activity was scheduled at the end of the day. Whether or not this would help solve the problem in any real sense is not clear, since it is possible that they would leave anyway and miss the last regular session of the day. A third individual suggested that more time should be spent discussing preassigned readings. These could be read before the presession or time could be allowed at the presession for reading them. Finally, one individual suggested that a glossary of terms be compiled to facilitate learning and discussion for those unfamiliar with some of the terms used.

9. Director's Evaluation:

In general, both the staff and the participants felt that the presession was successful. Probably the best single index of this success is the large marjority of participants who indicated on the questionnaires that the presession should be offered again.

The backgrounds, interests, and expectations of the participants were quite diverse, and better ways to individualize instruction could probably have been found. If we had had a better indication of these differences we could probably have done a better job of taking them into account. The information requested on the application form is of little usefulness in providing the type of information needed. Perhaps some form of pretesting, either before the presession begins or on the first day of the presession, would be useful. As it was, the attempts which the staff did make to individualize instruction and to provide some flexibility in the presession were often interpreted by the participants as reflecting a lack of structure and organization. It might prove worthwhile to have individuals with different backgrounds and interests

working in different subgroups. This way, it might be possible to carry on instruction at several levels at the same time.

One shortcoming of the presession was the failure to adequately convey the various objectives of the presession to the participants. Although attempts to articulate the objectives were made by the staff on the first day and throughout the presession, it is clear from some of the comments that we were not always successful in this regard. It appears to be important for the objectives to be stated in writing and made available to the participants. It would probably be useful to send them to the participants prior to the presession. Also, several participants indicated that they would have appreciated receiving a reading list or the bibliography prior to the presession.

It would be very desirable for the staff of a presession being offered the first time to be able to meet together several times for planning sessions. It is sometimes extremely difficult to do effective planning over the phone and via the mail. This is especially true if the staff members have not worked together in some way before. Although I was able to meet with each staff member for approximately a half day during the early stages of planning the presession, it would have been very useful if we had been able to meet as a group, perhaps during the middle or latter stages of planning.

A fairly extensive library of books and articles relevant to the topic of the presession was provided. One or two copies of almost every article on the bibliography was available for the use of the participants. The participants felt that this library was extremely useful.

Probably the most important function of the presession should be evaluated by the extent to which the presession encourages future research on the psychology of instruction. This aspect, of course, is extremely difficult to evaluate at the present time.

PRESESSION V

1. Title: Applied Linear Regression Analysis in Educational Research

2. Staff:

Joe H. Ward, Jr. (Director)	Southwest Educational Development Laboratory, San Antonio, Texas
Earl Jennings	University of Texas
Robert Bottenberg	Air Force Personnel Research Division, AFHRL, Lackland AFB, Texas
Janos Koplyay	Air Force Personnel Research Division, AFHRL, Lackland AFB, Texas

3. General Description:

The present presession, Applied Linear Regression in Educational Research was conducted by the same personnel and had the same orientation as the previous three presessions which held the name Multivariate Design and Analysis in Educational Research. The name change is in itself significant. First, the new name is much more in keeping with the content of the presession. In the past, participants had occasionally come to the presession with the idea that the content would be oriented toward such topics as multivariate analysis of variance, discriminant analysis, canonical analysis, factor analysis, and related multivariate techniques and might rightfully feel that the title of the presession was misleading. Another significant point can be made as regards the name change, however. In each past evaluation of the presession, participants have been allowed to answer an open-ended question regarding suggestions for future presessions. One of the suggestions made was to change the name to include the multiple regression approach, rather than use the term multivariate. The point being made here is that this is only one indication as to how the presession staff has favorably reacted to criticism; this ongoing evaluation has contributed to a continually improving mode of presentation.

4. Objectives:

The session is designed for education researchers who have the basic statistical tools in their repertoire, but because of the rapid improvement of computer techniques for the systematic organization and analysis of data are presently unable to formulate research problems for computer analyses that will yield answers

to the questions at issue. In general, the participant received his statistical training in the more traditional analytical procedures, and is unable to formulate his own problems and devise the most meaningful analysis.

The primary objective of this session is to assist the participants in developing techniques of formulating research problems for computer analyses so as to make full use of the multiple linear regression approach. Specifically, the participants will be able to:

1. Define vectors that express his conceptualization of a problem.

2. Formulate models appropriate for his specific problems without conforming to experimental designs for which prescribed computational procedures are available.

3. Identify vectors that represent information that has been measured on a continuum.

4. Define vectors so as to express nonlinear and interaction relationships.

5. Use categorical and continuous vectors in models developed to remove the 'contamination' of other factors (logic of covariance analysis).

6. Apply an unambiguous set of rules to the determination of the appropriate degrees of freedom to be used with the linear regression model.

7. Cite novel examples of research problems to which linear regression is applicable.

This session is designed to develop the appreciation of multiple linear regression as a general approach to the formulation and analysis of research problems. As such, the activities will be divided about evenly between lecture-discussion, laboratory exercises related to the objectives listed and exercises related to appropriate computer operations. The illustrative problems will come largely from the behavioral sciences.

Concepts and exercises will be introduced systematically as they are required in the logical development of the materials. Participants will have direct experience with data processing and computer equipment. Each participant will prepare a problem statement which reflects acquisition of concepts and development of the attendant techniques that are useful in conceptualizing research problems.

5. Schedule:

First Day: Morning:
Overview, objectives. Evaluation of Pre-attendance. Vector concepts. One attribute mutually exclusive categories. Three services problem. Linear dependence and partitioning a set of vectors into independent and redundant sub-sets. Fundamental vector operations

Afternoon:
Comparison of assumed and restricted models. Computation of the F statistic. Three services computer output. Equivalent models. One attribute problems involving mutually exclusive ordered categories and linearity. Application of the one attribute analysis.

Second Day: One-attribute computer output. Extensions of one-atribute analysis. Fifty states, stanines, two-lines, several lines, second degree polynomial. Extensions of one attribute analysis. Imposing restrictions to test for second degree polynomial.

Afternoon:
Logic of computer program. Assumptions of general linear model. Details of computer program, card preparation, DATRAN.

Third Day: Morning:
Two-attribute problems. Equivalent model for two-attribute interaction. Main effects.

Afternoon:
Two-attribute computer output. Extensions of two attribute analysis. Paired observations t-test, treatment by subjects, missing cells, extreme missing cells. Two-attributes with one ordered. Reparametrization. Iterative method of computing, PERSUB.

Fourth Day: Morning:
Three-group extension. Three-group analysis computer output. Extensions of two-attributes one ordered. Intersection at a specific point, main effects, polynomials. Extensions of two-attribute one-ordered. Interaction test, one-attribute with polynomials ordered.

Afternoon:
Two-attributes both ordered. Two attributes both ordered computer output. Extension of two attributes both ordered. Nonlinearity, complex interaction. Interaction test, both attributes ordered with polynomials. Orthogonal decomposition, and least squares.

Fifth Day: Morning:
Two attributes, controllable attribute ordered (VARICO). Synthesizing regression models. Further extensions. Discontinuity, change detection, attributes influenced by treatments.

Afternoon:
Regression models in judgement analysis and hierarchical grouping applications. Further extensions, summary, evaluation.

At various times during each day, laboratory sessions were scheduled.

6. Participants:

Of the 47 participants, 41 were male. Their mean age was 34.3. On the average, they have produced 2.2 research articles and spend about 53 percent of the time in research. Twenty-three possessed a doctorate. Fifteen have received funds to conduct research. Their distribution around the country is as follows:

East Coast	14	Canada	5
West Coast	2	Midwest	23
Mountain States	3	South	3

7. Instructional and Evaluation Materials:

For the past two years, the text by Bottenberg and Ward, Applied Multiple Linear Regression, has been mailed to participants after the staff received a notification of acceptance from the participants. They were also sent a copy of Activity 1. On the first day of attendance, the participants were given a closed book evaluation, which was another copy of Activity 1. Each participant was also asked two questions:

Did you receive the book?

Did you read the assignment?

Activity 1 was graded by the staff, with the following results:

Of those who had read the assignment, 35 did reasonably well on Activity 1, 4 did not do particularly well on Activity 1.

Of those who had not read the assigned reading, 1 did reasonably well on Activity 1, 3 did not do particularly well on Activity 1.

These results are considerably better than was true with the pre-mailing the previous year. With the rather inefficient job that the AERA has done in the distribution of the Educational Researcher (which contained the application blank), these results can be seen to be even more gratifying to the presession staff.

8. Evaluation and Test Results:

Immediately after the presession had been completed, the participants filled out an evaluation form. The questions are repeated here with totals regarding each question. Also included are comments felt worth remembering by the editors. It is important to note items 1-a through 24 were open-ended. The tallying done here is an interpretation of the participants open-ended response.

Directions: Please respond with a word, a phrase, or one or more sentences to as many of the following questions as you can. Your frank and honest evaluation can only benefit everyone concerned. Do not identify yourself by name unless you prefer to do so.

Environment and Facilities

1a. To what extent did the relative availabiltiy or unavailability of books and journals interfere with or promote your attempts to master the content of this session?

Favorable response (28) Unfavorable response (4)
Neutral response (8) Did not respond (3)

1b. To what extent did reproduced materials given to you by the staff improve matters?

Favorable response (38) Unfavorable response (0)
Neutral response (2) Did not respond (3)

"Xerox copies saved a lot of time. The 3-ringed notebook and the 'butterscotch' book made this presession."

2a. Did you feel that you lacked a 'place to work,' either alone or in small groups?

Yes (2) No (37) Neutral (4)

2b. Was your hotel room satisfactory?

Yes (33) No (2) Neutral (8)

3a. Which features of the meeting rooms were inadequate or not conducive to learning?

"Coffee was expensive." "Not enough elbow room."

3b. Which features were especially facilitative in the same regard?

"Some refreshments always available." "Plenty of room at the tables to spread out." "The arrangement of refreshments."

Scheduling and Organization

4a. Was five days too long a period to leave your work at home for the purpose of attending this session?

Yes (6) No (36) No response (1)

4b. Was five days too short a period in which to learn much of the content of this session?

Yes (20) No (19) Omit (4)

"Probably so. The basic approach can be understood in this time, but many of the tricky applications require more time." " In some respects, yes--I suspect that a number of participants wi-l suffer from isolation starvation as they return to their home environments." "I believe that I could profit from either additional days or another session to try and digest the many models and other excellent ideas presented."

5a. Were you allowed enough time in which to pursue activities of your own choosing?

Yes (24) No (16) Omit (3)

5b. Would you have preferred not to meet in the evening after dinner?

Yes (26) No (15) Omit (2)

"No, but this implies more days and/or sessions."

5c. Would you have preferred more or fewer meetings per day than there actually were? Or was the number of meetings per day agreeable to you?

Need more (0) Agreeable (30) Need less (8) Omit (5)

"Day meetings agreeable but should omit night meetings." "I think number of meetings is OK, but it should leave some time for digesting." "Agreeable (Except I prefer nights for own study)."

6a. Were the individual lectures too long to sit and listen or take notes?

Yes (14) No (27) Omit (2)

"Pacing was good--lecturers broke when there was a need."

6b. Were the lectures scheduled in an appropriate sequence?

Yes (35) No (2) Not sure (6)

7. Did you have sufficient time to interact with other participants?

Yes (28) No (12) Omit (3) "No--for some reason we worked so hard that we didn't get together much." "No, I would have preferred at least one short meeting to find out what applications others were making or anticipating making of materials."

8. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

Yes (2) No (39) Occasionally (2)

"They were readily available from 8 a.m. to 10 p.m.... very willing to assist." "Instructors were very accessible and very approachable."

9. Did the attempts to evaluate your progress and reactions during the session (and at this moment) interfere with your work here?

Yes (0) No (38) Not sure (5)

10. In general, was the presession well organized?

Yes (41) No (0) Not sure (2)

Content and Presentation

11a. Did the content of the lectures and readings presuppose far more training than you had?

Yes (10) No (26) Occasionally (7)

"No, but the lecturers went too fast." "Give one hour summary on the first day." "Sometimes, but not often." "To presuppose less would have made the sessions worthless."

11b. Should less training in these areas or more have been presupposed?

Less (12) More (8) Same (20) Omit (3)

12. To what extent was the content of the lectures and readings relevant to what you hoped to accomplish during the session?

Favorable response (31) Unfavorable response (0) Neutral (7) Omit (5)

"More on direct applications--less on replacement of other statistical applications." "Maybe fewer models with more depth in selected ones."

13a. Were the lectures stimulating and interesting?

Yes (35) No (0) Usually (8)

13b. Were the lecturers competent to speak on the subject assigned them?

Yes (42) No (0) Usually (1)

13c. Were the lecturers well prepared?

Yes (40) No (1) Usually (2)

14. Were you disapponted in any way with the group of participants?

Yes (1) No (42)

Answer each of the following only by checking the more appropriate blank:

15. If you had it to do over again, would you apply for this presession which you have just completed?

Yes (42) No (1)

16. If a presession such as this is held again, would you recommend to others like you that they attend?

Yes (43) No (0)

17. Do you anticipate maintaining some sort of contact with at least one of the presession staff?

Yes (33) No (10)

18. Do you feel that AERA is making an important contribution to education by sponsoring presessions such as this one?

Yes (43) No (0)

19. Do you feel that anything has happened during these five days to make it more likely that you will leave your present position of employment?

Yes (3) No (40)

20. Is it likely that you will collaborate in research with someone else attending this presession (other than those you already were likely to collaborate with)?

Yes (9) No (33) Unsure (1)

21. Do you feel that the staff should feel that it has accomplished its objectives during this five-day presession?

Yes (43) No (0)

The participants were asked to make comments and suggestions concerning the presession. Their suggestions, and the number of times each suggestion was made, can be summarized as follows:

1. An advanced session to follow up this presession should be arranged. (6)

2. Participants need more statistical background. (3)

3. The entire book (Applied Multiple Linear Regression) should be read before coming. (2)

4. More geometric (graphical) interpretations (1)

5. Cut some examples--concentrate on main ones. (1)

6. Break up lectures with more activities (1).

7. More time on complex concepts. (1)

8. A bibliography of work in this field would be helpful. (1)

9. Allow time for individual problems. (1)

9. Director's Evaluation:

It is worthwhile to compare this list of suggestions with a similar list from the previous years' evaluation. In 1968, only three suggestions were given more than three times:

1. Send out materials (such as Bottenberg and Ward's textbook) before the presession.

2. An advanced session to follow up this presession should be arranged.

3. More attention should be given to individual problems.

The first of these suggestions was implemented for the 1969 presession; the second and third suggestions in 1968 became the first and second most often given in 1969. Implementing the suggestion of having an advanced follow-up session continues to be the leading suggestion, and its implementation would seem to be able to draw a competent and enthusiastic audience. Specifically, implementing an advanced follow-up session might well necessitate federal funding, if it were to be adequate both in scope and being given to the intended audience. An application for such a post-session is now under consideration (tentatively scheduled for the summer of 1970). Hopefully, funding can be arranged.

The second suggestion concerning allowing time for individual problems was specifically mentioned only once. This can be interpreted to mean that the staff is trying to extend help in this direction.

Other suggestions given in 1969 included: number the handout sheets, material on overhead projector could be given in handouts; and title of presession should refer to the multiple regression approach. The staff has implemented all three of these suggestions. The first two suggestions were combined into the production of what might be considered as a detailed chronology of the presession. The change in name of the presession quite obviously has also been effected.

The 1970 suggestions tend to be more oriented

to specifics of presentation rather than more concrete suggestions for change in direction. Several of the suggestions are not really within the presession staff's control. Apparently, the presession as an entity has reached full maturity.

Some comments (open-ended)by the participants follow:

"The presession acceptance should instruct the people admitted to read the entire text carefully, rather than 30 pages. Perhaps a pre-quiz which encompassed the entire book would be advantageous."

"The only point which I feel could be expanded is to the introduction of the session and the preamble to the individual activities. I felt I was not as ready to define the specifics that were involved in each problem."

"We desperately need (and also want) to push this further. I'd like a presession for past participants to push things further."

"For the relatively novice statistician, this is just too much to understand all at once. The first two days seemed very manageable, but my ability to appreciate some of the points made from then on diminished rapidly."

"I never really had a traditional regression course, as such. This may be a help or hindrance, I don't know. What does concern me is my ability to communicate what I have learned about a 'new' research tool to people far more powerful than me in use of traditional statistical methods. It seems to me, I almost have to be at the same level of sophistication in order to promote acceptance."

"The content of this session should form a course (one semester at least) of all psychology and educational psychology departments of all the nation's graduate schools."

"Excellent presentation, enjoyable."

"Learning and mastery should be greatly facilitated by the comprehensive materials distributed at this presession. Staff and participants were all most helpful and enthusiastic. Thank you very, very much."

"The presession should be at least two weeks long (although this might imply changing the name to 'summer post-sessions' or 'summer institutes'). If of-

fered during summer, a full summer session sounds much better."

"All in all, I thought it was great."

PRESESSION VI

1. Title: Human Behavior Genetics and Its Implications for Educational and Behavioral Research

2. Staff:

Steven G. Vandenberg (Director)	University of Colorado
Sandra Scarr	University of Pennsylvania
Arthur R. Jensen	University of California, Berkeley
Kenneth R. Henry	University of Wisconsin

3. General Description:

Part of the session was aimed at a broad audience of those who wish to learn some of the practical implications of recent advances without getting involved with too many technical details. Administrators concerned with policy would thus be able to base their decisions on informed opinion. At the same time, most of the lectures were at a somewhat more technical level and included reference to appropriate statistical or laboratory techniques. This part of the presentation was aimed at researchers, research advisors, and those teaching any courses which may touch on hereditary contributions to behavior.

4. Objectives:

The aim of the presession was to bring the participants up to date on the recent advances in human genetics, many of which are relevant to behavior. These advances have made more understandable the role of genes in regulating behavior, and in several instances allow prevention or cure of the behavioral defects. In turn, the possibility of treatment has changed the attitudes toward genetics. Instead of fatalistic acceptance of hereditary defects, there now is the hope of discovering ways to intervene in ever growing numbers of cases. Discussion of the discovery of each cytological or biochemical abnormality was to be related to the behavioral consequences. After the single gene substitutions and chromosomal abnormalities, discussion shifted to quantitative genetics, using height, intelligence and personality as the examples. Data from several types of 'natural experiments' were reviewed such as twin studies, adoptive children, inbreeding, and incest. Several statistical approaches to estimating heritabilities were contrasted. In other lectures the acquired insights were utilized in approaching such applied problems as: Is the national IQ declining? Are there racial differences in IQ? Why do deleterious traits continue

to exist even when they lower genetic fitness?

5. Schedule:

First Day: Morning:
Movie, 'How Life Begins.' Review of Mendel's laws. Examples in man of dominant and recessive inheritance. Sex determination, anomalous color vision. The story of PKU, discovery, biochemical cause, diagnosis and mass screening, treatment by diet, carrier detection, genetic counseling, amniocentesis and therapeutic abortion, possibility of 'cure' by implantation of enzyme capsule. Other examples of inborn errors of metabolism (galactosemia, Gaucher's disease).

Afternoon:
Lecture by Dr. V. Elving Anderson on Genetics of Mental Retardation. Film, 'Medical Genetics, Part 1.' Mitosis and Meiosis. Non-disjunction causing aneuploidies such as Down's syndrome, Turner's and Klinefelter's. Crossing over, linkage, mapping of chromosomes. Sexlinkage. Linkages established in man.

Evening:
No host cocktail party for participants and staff of all workshops at the Leamington Hotel: AERA Central Office Staff will be present.

Second Day: Morning:
Film, 'Medical Genetics, Parts II and III.' The genetic code, theory of evolution illustrated by haemoglobins in man and other species. Balanced polymorphism illustrated by sickling & malaria.

Afternoon:
Effect of sex chromosome aneuploidies on intelligence; are XYY predisposed to crime? Quantitative genetics. Approximation to normal distribution with relatively few genes. Definitions of heritability. Additive variance, variance due to epistasis. Heritability from twin studies; from parent-offspring data. Assumptions of twin studies. Studies of adopted children.

Evening:
Evidence for quantitative inheritance of intelligence from inbreeding and incest. Assortative mating, mate selection and their genetic consequences.

Third Day: Morning:
Findings of twin studies with respect to intelligence, special abilities, personality, crime, homosexuality. Evidence from twins raised apart.

Afternoon:
Multivariate analysis of twin differences. Cattell: MAVA Method, Elston's proposals. Conceptual relationship between instincts and heredity. Imprinting, critical periods. Evolution of the mammalian nervous system.

Evening:
Discussion group.

Fourth Day: Morning:
Evolution of sensory systems. Evolution of learning and problem solving. Hodos criticism, evolution of human society. Possibility of directed evolution. H. J. Muller's proposals. Positive and negative eugenics. Cattell & Horn's theory of fluid and crystallized intelligence.

Afternoon:
Animal behavior genetics: special methods such as selective breeding, use of isogenic strains, cross-fostering, diallel crosses and other designs. Genetics of audiogenic seizures.

Evening:
Free

Fifth Day: Morning:
Is the national IQ declining? The money value of an IQ as estimated from expected life earnings. Social mobility. Are we headed toward a meritocracy and class society? Moderating influence of education (nursery, elementary and secondary school and college). Are there racial differences in IQ? Arguments for and against. Evidence from cross cultural studies. How could this question be answered.

Afternoon:
Future directions of research in human behavior genetics. Lecture by Dr. Irving I. Gottsman on genetic factors in schizophrenics. Administration of evaluation material. Short achievement test.

6. Participants:

Thirty-four educators and researchers attended.

7. Instructional and Evaluation Materials:

The lectures were evenly distributed between the staff, so that Jensen, Scarr and Vandenberg lectured about one-third of the time. Dr. Scarr was replaced on Sunday and Monday by Dr. Henry. The actual topics discussed are shown in the schedule above. Shortly before the first lecture, a list was distributed of 64 technical terms commonly used in Behavior Genetics.

The following reprints were also distributed:

By S. G. Vandenberg:

Contributions of Twin Research to Psychology. Psychol. Bull. 1966, 6: 327-352.

Hereditary factors in psychological variables in man, with a special emphasis on cognition. In James S. Spuhler (Ed.) Genetic diversity and human behavior, Chicago, Aldine, 1967.

The Nature and Nurture of Intelligence. In David C. Glass (Ed.) Biology and Behavior: Genetics, New York, Rockefeller University Press and Russell Sage Foundation, 1968.

Human behavior genetics: present status and suggestions for future research. Merrill Palmer Quarterly of Behavior and Development, 1969, 15: 121-154.

From the Life Educational Reprints Series:

Life Before Birth
DNA - The Secret of Life

From W. H. Freeman (Scientific American Reprints):

W. A. H. Rushton - Visual Pigments in Man
Marshall W. Nirenberg - The Genetic Code: II
Edward F. MacNichol, Jr. - Three Pigment Color Vision
Emile Zuckerkandl - The Evolution of Hemoglobin

F. H. C. Crick - The Genetic Code: III
David C. Phillips - The Three Dimensional Structure of an Enzyme Molecule
Anthony C. Allison - Sickle Cells and Evolution
Ruth Hubbard & Allen Kropf - Molecular Isomers in Vision
C. A. Clarke - The Prevention of 'Rhesus' Babies
Luigi Luca Cavalli-Sforza - 'Genetic Drift' in an Italian Population

The evaluation of the degree to which the objectives of the presession workshop on Behavior Genetics were achieved is based on three sources of information:

1. A subject mastery test.

2. A questionnaire.

3. Comments in letters.

8. Evaluation and Test Results:

The results of the test of subject matter administered showed a gratifying performance. The percentage of persons giving the correct answers to each of 24 items is shown below. The test was administered in two parts to interfere less with the lectures.

Item	% Correct	Item	% Correct	Item	% Correct
A-1	95.5	A-9	4.5	B-7	77.0
A-2	81.8	A-10	86.4	B-8	77.0
A-3	81.8	B-1	69.2	B-9	53.8
A-4	54.5	B-2	100.0	B-10	15.4
A-5	59.1	B-3	30.8	B-11	84.6
A-6	77.3	B-4	69.2	B-12	53.8
A-7	77.3	B-5	84.6	B-13	84.6
A-8	68.2	B-6	69.2	B-14	30.8

A questionnaire concerning the participants satisfaction with the presession was administered. This questionnaire was kept short in order to avoid burdening the participants with too much paper work on top of the evaluation form common to all 10 presessions which was also administered on the last day.

This questionnaire with the actual items and the responses follows:

Name (optional) _____

Opinionaire about AERA Presession Workshop on Human Behavior Genetics, Feb. 25 - Mar. 2.

Did you learn as much from the workshop as you thought you would when you signed up?
No 2 Yes 15 More 2

Would you have participated if you had a chance to relive this week?
No 1 Yes 18

Were the movies useful?
Very 3 Yes 16 No 0

Rate each instructor 1 to 5, with five high.
Mean Ratings: Scarr 3.9, Henry 2.7, Jensen 4.1, Vandenberg 3.7

Which topics did you find most interesting?
All topics were mentioned by someone. The topics on Monday were especially singled out.

Are you planning to use what you learned?
Yes 19

Was the time schedule satisfactory?
Yes 17 Days too long 2

Was the arrangement of the room satisfactory?
Too crowded 5 Satisfactory 14

Please comment on any other aspect of the program that pleased or displeased you. (The following are comments that were made--mostly unsigned).

1. I would have wanted to spend more time on Jensen's material and subsequent replies.

2. Fine program.

3. Was disappointed about the continuing slide projector problem. (Some slides did not fit projector.)

4. More on quantitative methods and data treatment and analysis.

5. Could have used a little more elbow room.

6. I felt it to be of great value and stimulation to me personally, especially since I knew relatively little of the biochemical and population genetics aspects.

7. Excellent workshop!!!!

8. I liked the informality coupled with the unusually convenient opportunities to interact with the staff and participants.

9. It would be helpful to have fairly structured material to read outside class on all topics. Reprints of figures and tables would also be helpful. I would have been interested in spending more time on quantitative genetics.

10. I think we could use a geneticist--non behavioral to blend more of the animal studies with human work.

11. Room problems occurred due to hotel management mix-up.

12. Air conditioning too loud.

13. Dr. Scarr was always organized and able to explain slides clearly and could anticipate when the group was having difficulty with some material.

Letters received since the workshop contained the following statements:

'I thoroughly enjoyed the workshop and I felt it was very informative. It gave me a good idea of what is happening in Behavior Genetics today.' Jim Halle

'I'm afraid that one thing which I learned from this year's AERA conference is that it is much better to attend a meeting away from one's home community. I discovered that it is much too easy to recall the pressures which are building up at the office and decide not to stay at a particular meeting. All this is to say that I attended the Behavior Genetics presession only on Thursday and part of Friday. From what I did see and hear, however, I learned a great deal and appreciate your willingness to develop the presession.' Jack E. Rossmann

'Let me thank you at this time for a most useful experience at the Presessions. I am already beginning to formulate plans for research in the area of Behavior Genetics as a result of what I was introduced to at Minneapolis. Keep up the good work.' Conrad A. Reiche rt

'I would like to state my satisfaction with this Presession. It is my personal feeling that it was highly informative, well presented and useful to me both as a teacher and researcher.' David R. Taylor

'I attended every single blessed one of the sessions at the workshop on Behavior Genetics and found them without exception to be informative, stimulating, and very worthwhile.' L. R. Aiken

'The only criticism I have of your Presession is that it would have been helpful if I could have received the list of references somewhat earlier. I ordered the Fuller and Thompson book and your own 1968 'Progress' volume ahead of time; however, your book arrived only a few days before I left for Minneapolis, while Fuller & Thompson did not arrive at all (it was waiting for me when I returned this week).' Jack G. Hutton, Jr.

'I would like to say again that I have profited greatly from your Presession. We have two seminars underway here at the Graduate School which will deal with the topic of genetics and with Dr. Jensen's work in particular. I believe that I can make a far more meaningful contribution to these discussions because the data presented at the Presession brought the topic into focus very clearly. It was my privilege to have been a participant.' Pamela Sarett

'I enjoyed the workshop very much and learned a great deal. However, I was somewhat ill during the last afternoon session and didn't get as much out of it as I would have hoped.' Richard W. Smith

'I attended all sessions and thoroughly enjoyed every minute.' Jacques H. Robinson

'With time out for church services, I attended every session you conducted.' Key T. Lee

'It certainly was a pleasure to meet you and your staff. Needless to say, I thought the Presession to be very informative and an exciting learning experience.' Gloria D. Bernheim

'I must say that the meetings and the subjects explored made the training session the best I have ever experienced.' John M. Ewing

'Enjoyed it. Best wishes.' Alexander I. Law

'I want to express my appreciation for your supervision. I enjoyed the sessions and feel that they were well worth the time involved.' Suzy E. Holmes

'You can quote me to AERA sayin g that I have attended several workshops and I feel that this was the best one in which I have participated.' Vernon Van De Riet

'I certainly appreciated the opportunity of attending the Presessions and feel I gained much from it. Tonight I begin teaching a class on the Biology of Learning and Behavior for graduate education students.

It is the first time that such a course has been offered by our college. Most of our topics will be concerned with Behavioral Genetics.' Donald L. Lantz

9. Director's Evaluation:

From the results of the evaluation, it appears that the participants considered the Presession a success and thought that they learned a lot. The objectives of the workshop have clearly been met.

More time between the announcement of the presession and the actual workshops would permit more time for preliminary reading by participants.

Holding each Presession by itself, perhaps in a motel, would probably solve the problem of an adequate meeting room and adjacent bedrooms for the participants.

Use of handouts which contain the same information as the slides do would give the participants more permanent information.

We could have proceeded somewhat slower if we had had another day.

The local coordinators should be university connected, preferably an assistant professor who is an AERA member.

PRESESSION VII

1. Title: A Systems Approach to Instructional Research and Design

2. Staff:

Stephen L. Yelon (Director)	Michigan State University
Roger O. Scott (Director)	Southwest Regional Laboratory for Educational Research and Development
Norman T. Bell	Michigan State University
Allan J. Abedor	Michigan State University
Frank Cookingham	Michigan State University
Frank A. Smith	Southwest Regional Laboratory for Educational Research and Development

3. General Description:

During the past few years, a great deal has been written about the value of precise, measurable educational objectives. Yet, educators are typically frustrated in their attempts to develop objectives for instructional sequences to be used in their teaching or research. Their efforts are often reported as difficult and unrewarding and the resulting objectives are frequently trivial, unrepresentative or unrealistic.

It is our experience that the major cause of these problems is the lack of a technology devoted to the analysis and derivation of instructional variables. The neglect of this area has doomed many applications of innovative instruction to failure or only partial success. A naiveté regarding this technology on the part of the researchers has led to many studies with muddled results--studies based upon curricula which do not lead to the desired behaviors, studies which were improperly sequenced or studies which did not take into consideration important factors influencing subject behavior.

Elements of the technology of the analysis and design of instructional variables do exist. Much has been written about behavioral objectives and the techniques of task analysis have been outlined by a number of authors. However, acquisition of skills in objective writing and task analysis is not sufficient.

What is needed is the ability to use a complete strategy which leads the educator or researcher from a broad general goal to the development of specific plans for subject behaviors. This is a prerequisite for useful instructional research, for the development of effective instruction and for improving the unhappy record of educational innovations.

4. Objectives:

The following objectives concern the participant's abilities to analyze the variables involved in the instructional problem each participant brought to the presession. At the end of the presession, participants turned in a report which included:

1. A statement of the problem in form of a question, which when answered, will achieve the desired instructional goal.

2. A description of the system including all subsystems, their functions and interrelations according to the format given in the presession.

3. A description of the system as explained by a theory or model which best fits the system's constraints, resources, and goals.

4. A description of the modifications of the system as suggested by the model or theory.

5. A list of the dependent variables drawn from the suggested modification.

6. A list of the independent variables drawn from the suggested modification according to the formats given in the presession.

7. Statements showing the relationships between the variables listed.

8. At least one dependent variable stated in operational terms according to the format and the criteria given in the presession.

9. At least one dependent variable described by a flow diagram so that it could be used as a set of instructions.

10. Requisite concepts, principles, facts, skills or strategies of dependent variables listed.

11. At least one independent variable stated in operational terms.

12. A cost-benefit analysis according to the formula given in the presession.

5. Schedule:

First Day: Morning:
Introduction of staff. Analysis of Pretests section. Overview. Pretest for day's objectives. Presentation: Objectives.

Afternoon:
Small group work assignments (monitored and enforced). Individual Work assignments.

Second Day: Morning:
In small group, review previous day's individual work. In large group, review previous day's group work. Pretest day's objectives. Presentation: Task Analysis.

Afternoon:
Small group work assignments (monitored and enforced). Individual work assignments.

Third Day: Morning:
In small group review previous day's individual work. In large group review previous day's group work. Pretest day's objectives. Presentation: Sequencing Strategies. Presentation: Research Priorities.

Afternoon:
Small group work assignments (monitored and enforced). Individual work assignments.

Fourth Day: Morning:
In small group review previous day's individual work. In large group review previous day's individual work. Pretest day's objectives. Presentation: Materials for Appropriate Practice.

Afternoon:
Small group work assignments (monitored and enforced). Individual work assignments.

Fifth Day: Discussion and feedback. Evaluation

6. Participants:

Approximately 50 individuals applied to the AERA Presession, A Systems Approach to Instructional Research and Design. The staff planned to have no more

than 30 participants in order to allow an adequate amount of monitoring and guidance. For this reason, only the first 37 applicants were accepted. As expected, there were several last minute withdrawals and a total of 30 individuals completed the presession.

7. Instructional and Evaluation Materials:

A package of instructional materials was sent to each participant in advance of the presession. This package described the presession objectives and asked a series of questions about a description of an instructional problem. The responses to these questions gave the staff an indication of the entry skill levels of participants. During the presession, more than 200 pages of handouts were made available. These materials, many of which were text and learning exercises written exclusively for the presession, were packaged in a participant notebook. The notebook materials included the following units: introducing instructional systems (9 pages), writing a problem description (7 pages), using educational and psychological models (9 pages), making cost/benefit analyses (33 pages) and analyzing and operationalizing instructional variables (70 pages). In addition to the above materials, each participant was asked to work through a programmed text, A Strategy for Writing Objectives.

8. Evaluation and Test Results:

During the course of the presession, each participant was encouraged to apply the skills being taught to an instructional problem which he needed to solve. The staff felt that it was important to evaluate the presession in terms of how well the skills identified inthe objectives were being applied to analyses of these problems. Accordingly, twelve criteria, each representing the attainment of all or a portion of a presession objective, were selected and used to evaluate each participant's analysis of his own instructional problem. The results of this evaluation show that 20 or more participants attained at least ten of the criteria. The following criteria were used in the evaluation:

1. Is the problem stated in the form of a question, which when answered will achieve the desired instructional goal?

2. Is there a statement which includes the learner's, teacher's, and the environment's characteristics? (At least three descriptors of each.)

3. Has a theory or model been proposed as a foundation for a problem solution?

4. Is a change in learner, teacher, and/or environmental characteristics proposed as a problem solution?

5. Are dependent variables which define the solution or a part of the solution listed?

6. Are independent variables which define the proposed change or a part of the proposed change in the learner, teacher, and/or environmental characteristics listed?

7. Is there a statement of the hypothesized relationship between at least one dependent and one independent variable?

8. Is at least one dependent variable defined in operational terms? (Learner behavior, conditions and criteria for acceptance.)

9. Is there a flow chart illustration of at least one dependent variable?

10. Is there a statement of skills prerequisite to the behavioral change stated in the dependent variable?

11. Is at least one independent variable defined in operational terms?

12. Is there a cost estimate for making the proposed changes?

Twenty-six of the 30 presession participants responded to an anonymous questionnaire. This instrument was designed to measure whether the participants felt that they had learned skills which the staff had attempted to teach and whether they judged these skills to be useful.

9. Director's Evaluation:

The Program was well received by the participants.

PRESESSION VIII

1. Title: Person-Free Item Calibration and Item-Free Person Measurement

2. Staff:

Benjamin Wright (Director)	University of Chicago
William Bramble	University of Kentucky
Ward Keesling	University of California, Los Angeles
William Schmidt	Michigan State University
William Angoff	Educational Testing Service

3. General Description:

The topic is a mathematical model for objective measurement in educational research. We describe, explain, and illustrate a new approach to psychological measurement which achieves an important kind of measurement objectivity. The approach is based on the work of the Danish mathematician, Georg Rasch. Illustrations focus on the dichotomous observations characterizing ordinary item analysis.

The nuclear issue in measurement is the choice of model used to transform qualitative observations into quantitative measurements. A vital property of the model is the extent to which it makes possible measurement objectivity. Operationally, objectivity means that the calibration of measurement instruments, e.g., standardization of tests, is independent of the characteristics of the calibrating objects, e.g., the sample of persons used for the standardization. It also means that measurements made with calibrated instruments are independent of the particular instruments used to make the measurements, e.g., the set of items chosen from the item pool to compose a test.

The importance of this approach for psychological measurement stems from its handling of the connection between the normative sample used for test standardization and the subsequent use of the test in measurement. The measurement objectivity achieved avoids the usual connection between instrument calibration and person measurement. Instruments are calibrated and item pools are built on a person-free basis so that the unknown true distribution of the latent trait becomes irrelevant to instrument construction. Once an item pool is constructed, instruments for making individualized person measurements can be composed out of any subset of items.

Even though each measuring instrument may contain a different set of items, the resulting measurements can be on a common scale for the latent trait to be measured.

4. Objectives:

Participants acquired an overview of this approach to measurement including a recognition of the importance of measurement objectivity and an elementary mastery of how logistic models are used to solve measurement problems. Participants worked through applications of the method to real data, and were able to apply the method to their own data if they wished. They had a chance to work on measurement problems during the session.

5. Schedule:

First Day: Morning:
Introduction and orientation. Organization of data analyses.

Afternoon:
The Theory of Objective Measurement.
Set up first round.

Evening:
Measurement tutorial. Compute first round.

Second Day: Morning:
Probability Structure of the Measurement Model. Evaluate first round.

Afternoon:
Logistic Estimation of Model Parameters.
Set up second round.

Evening:
Data Analysis tutorial. Compute second round.

Third Day: Morning:
Mean Value Estimation of Model Parameters.

Afternoon:
Statistical Control of the Model

Evening:
Free

Fourth Day: Morning:
The Necessity of the Measurement Model.
Evaluate final round.

Afternoon:
Computer Programming of the Model
Summarize data analyses.

Evening:
Data Analysis tutorial.

Fifth Day: Morning:
The Strategy of Item Pools and Test Designs.

6. Participants:

The 37 full-time participants attending the AERA Presession on 'Person-Free Item Calibration and Item-Free Person Measurement' represented a wide range of abilities and interests. They represented 13 universities, 5 test publishers, 4 government institutions, and 2 state departments of education located in 18 states and Canada.

The geographical distributions of those attending are as follows: Minnesota, 5; California, 4; New York, 4; Canada, 3; Illinois, 3; District of Columbia, 3; Maryland, 3; Georgia, 1; Wisconsin, 1; Florida, 1; Rhode Island, 1; Virginia, 3; North Carolina, 2; Michigan, 2; Kentucky, 1; Oklahoma, 1; Ohio, 1; Massachusetts, 1; and Pennsylvania, 1.

The universities represented include the Universities of California at Los Angeles, Chicago, Georgia, Kentucky, Maryland, Miami, Minnesota, Virginia, and Wisconsin at Milwaukee; Michigan State, New York State, and Ohio State Universities; and Rhode Island State College.

The test publishers include Educational Testing Service, Harcourt, Brace and World, Inc., American Guidance Service, Ontario Institute for Studies in Education, and Educational Services Center.

The government instutitions include U. S. Coast Guard, U. S. Civil Service Commission, Naval Medical Research Institute, New York State Department of Civil Service, and the California and Pennsylvania State Departments of Education.

7. Instructional and Evaluation Materials:

Evaluation in such a heterogeneous group is difficult. To handle the diversity, a dual scheme was adopted. First, participants were asked to define their own objectives and reasons for attending. Second, four general objectives were specified by the staff and participants were asked to indicate which of these four were important to them. This information was collected at 9:00 a.m. on the first morning of the

presession. Then at the end of the fifth morning, participants were asked to report how well they felt their goals had been realized during the presession.

8. Evaluation and Test Results:

A summary of the responses follows.

Twenty-three participants were interested in the application of the measurement model to their own data and brought data with them to analyze during the presession. One hundred nine computer runs were completed for these 23 participants analyzing the application of the measurement model to 39 different educational tests.

Six participants did not complete evaluation forms.

List the objectives you hope to realize by attending this presession. (Tabulation indicates if objective was realized.)

1. To understand the theory of the measurement model.
Yes, 23 Uncertain, 1 No, 0

2. To apply the model to real data.
Yes, 15 Uncertain, 4 No, 1

3. To clarify the robustness and limitations of the model.
Yes, 9 Uncertain, 1 No, 0

4. To relate this model to other models.
Yes, 8 Uncertain, 0 No, 4

5. To gain mastery of the test construction techniques implied by model.
Yes, 6 Uncertain, 1 No, 0

6. To learn how to use computer program for model.
Yes, 4 Uncertain, 2 No, 1

7. To establish communication with others about this kind of work.
Yes, 3 Uncertain, 0 No, 0

Additional objectives:

1. An overview of the logistic model approach to measurement.
Yes, 28 Uncertain, 0 No, 1

2. An understanding of the importance of objectivity in measurement.
Yes, 21 Uncertain, 0 No, 0

3. The ability to apply the model to real data.
Yes, 24 Uncertain, 1 No, 1

4. A knowledge of the types of situations in which the model can be applied.
Yes, 17 Uncertain, 8 No, 1

Comments about various aspects of the presession, with number giving various answers:

1. What did you particularly enjoy about the presession?
11 Style of presentation
10 Data analysis
8 Theory
5 Enthusiasm of staff
4 Group discussions

2. What suggestions would you make for the improvement of the presession?
13 Special sessions for advanced participants
5 More data analysis
4 More handouts

3. What were the real strong points of the presession?
9 Data analysis
7 Theory
6 Handouts
5 Logical organization
5 Good speakers
5 Flexibility and individual attention

4. What were the weak points?
6 Too little time
5 Too mathematical
4 Boring instruction
2 Too little data analysis

5. Were you satisfied with the presession, i.e., was it worth the time, money, and effort you expended?
30 Satisfied
1 Dissatisfied

6. Did you analyze data? If so, how did it turn out?
18 Satisfied
2 Dissatisfied
20 (Of 23 who brought data)

9. Director's Evaluation:

The presession was hard but challenging work. The variety of participants required preparation of materials and presentations on several levels. To accomplish this we had a series of preliminary working sessions to prepare the instructional staff to deal with both naive and sophisticated participants who wished to become more sophisticated to follow the presentation and to study the presentation material subsequently. Finally, we arranged to have simultaneous sessions at different levels of sophistication. Even so, not all participants were satisfied. A few were impatient with elementary session, others were frustrated by sessions which were too advanced for them. In spite of these complaints, which were few in number, our overall effect was quite satisfying. The majority of participants found the presession valuable for them as can be seen in the evaluation data.

Once again, our chief headache was adequate communication with a computer. This time we used the facilities of Control Data Corporation. We tried to arrange to have a remote terminal installed in the Hotel Leamington so that we could have immediate access to the computer. This turned out to be too expensive for us to finance or for Control Data to grant as a gift. Instead, we had to rent a car and use valuable staff time driving back and forth between the hotel and the computer location. The provision of fresh analysis of their own data for participants to work with and to discuss was and is essential for this kind of presession. We were compelled to expend staff time to make this possible. But, we look forward to the day when several presessions can team up and arrange for a remote access terminal located on the site of the presessions and connecting all of us with an adequate large computer.

An important outcome of this 1970 presession is the continued growth of a group of active test constructors and psychometricians concerned with the development of objective techniques for educational measurement working together through their contact during the presession to establish better sharing of techniques and experiences with each other. This outcome goes beyond the particular psychometric techniques taught in the presession and extends to the entire professional activity of these participants.

Dr. Alexander Even of the Ontario Institute for Studies in Education continues to coordinate the communications of the growing group by publishing a newsletter of reports from members of the group which he distributes to members of this group and a larger group of previous participants and others interested in objective measurement.

PRESESSION IX

1. Title: Multivariate Statistical Analysis in Educational Research

2. Staff:

M. I. Chas. E. Woodson (Director)	University of California, Berkeley
R. Darrell Bock	University of Chicago
Neil H. Timm	Carnegie Commission
Jeremy D. Finn	State University of New York at Buffalo
Joel R. Levin	University of Wisconsin
Roger Koehler	Ohio University
Robert M. Pruzek	State University of New York at Albany
Michael Waller	Chicago, Illinois
Bruno H. Repp	Chicago, Illinois

3. General Description:

The course content consisted of an introduction to the concepts and techniques of multivariate analysis, including computer programs for making the appropriate calculations. Topics included: Hotelling's T^2, multivariate regression and canonical correlation, multivariate analysis of variance, and multivariate data reduction techniques.

4. Objectives:

The primary objectives of this presession are:

1. To present and interrelate the basic techniques and concepts of multivariate statistical analysis and to provide a foundation which will assist the researcher in applying these to educational research problems.

2. To assist the participants in gaining some practical knowledge of the use of computers for doing multivariate analysis calculations.

5. Schedule:

First Day: 1. Overview of the Presession and procedures. (All instructors.)

2. The Role of Multivariate Methods in Educational Research (Bock)

3. Review of univariate analysis and elementary matrix algebra (Woodson)

4. Elementary matrix operations and more matrix algebra with application to data matrices (Pruzek)

5. Introduction to computers. Univariate examples. One MANOVA example (Finn)

6. Optional computer session (Finn & Levin)

Second Day: 7. Questions and review of the first day

8. General multivariate linear model: Hotelling's T^2, one- and two-sample (Timm)

9. Computer exercises (Finn & Levin)
Data reduction techniques: Discriminant analysis (Timm)

10. Intuitive introduction to multivariate analysis of variance (Pruzek)

11. Computer exercises (Finn & Levin)
One- and two-sample repeated measures

12. Optional computer session (Finn & Levin)

Third Day: 13 Questions and review of the second day

14. MANOVA: one way (Timm)
MANOVA: criteria

15. Computer exercises (Finn & Levin)

16. MANOVA: Factorial designs (Timm)

17. Data analysis (Pruzek)

18. Computer exercises (Finn)
Regression analysis, canonical correlation, multivariate analysis of covariance (Timm)

Fourth Day: 19. Questions and review of the third day.

20. MANOVA: Unequal cell sizes (Finn)

21. MANOVA: Nested designs and block designs (Timm)

22. Computer exercises (Finn & Levin)
The relationship between factor analysis and MANOVA (Pruzek)

23. 2^k MANOVA designs and planned contrasts (Pruzek)

24. Computer exercises (Finn & Levin)
Missing data in data reduction problems (Timm)

25. Optional computer sessions (Finn & Levin)

Fifth Day: 26. Questions and review of the fourth day.

27. Methods and issues in the analysis of repeated measures and in the analysis of covariance (Bock)

28. MANOVA: Repeated Measures Designs (Finn)

29. Discussion and evaluation of presession (Woodson)

30. Panel discussion: Multivariate statistical analysis in educational research (all instructors)

6. Participants:

Applications were screened and evaluated by the director in consultation with the staff. Approximately 85 applications were received, 75 were admitted and 64 actually attended.

A priority system was established on admissions. Persons holding a doctorate and teaching graduate courses in applied statistics at the level of Hays and Kirk were admitted at once. Following that, persons with a doctorate and reporting considerable formal training in applied statistics were admitted. Following that, persons without the doctorate but with special interest in these techniques were admitted. Persons indicating very little background in statistics were not admitted.

7. Instructional and Evaluation Materials:

Handouts were given to all participants.

8. Evaluation and Test Results:

None were made.

9. Director's Evaluation:

The major factor in the success of the presession on 'Multivariate Statistical Analysis' was the excellent staff. Their work and high degree of competence combined favorably with their variety of interests and approaches.

One of the major problems we expected and did encounter is that many researchers do not know what multivariate statistics are and are unprepared to find the topic difficult.

Some participants felt the description in the Educational Researcher was misleading. The description of the course as being for applied researchers was relatively accurate, but more effort could have been made to indicate background necessary for multivariate statistics.

The computer sessions were generally disappointing. Through a series of difficulties with the computing facilities available (both the University of Chicago facility and the backup commercial facility arranged for), actual computer runs were very limited. Fortuntely, the staff, particularly Levin and Finn, had prepared pre-run outputs which were distributed and discussed. This substitute was effective. This experience suggests that in the future we should be careful to prepare examples for distribution and not count on computer availability. The opportunity to submit computer runs is an important part of the objectives of the sessions and we hope it will be more successful next year.

PRESESSION X

1. Title: Powerful Statistical Techniques for Qualitative as Well as Quantitative Variables

2. Staff:

Douglas A. Penfield (Director)	Rutgers University
Maryellen McSweeney (Director)	Michigan State University
Andrew Porter	Michigan State University
Leonard A. Marascuilo	University of California, Berkeley
Stephen Lawton	University of California, Berkeley
David Wright	Michigan State University

3. General Description:

Our purpose in teaching this five-day presession was to present the most current and the potentially most useful nonparametric statistical procedures that could be applied in educational research. It was our hope that the researchers who attended this session could put these techniques to immediate use when analyzing their own experimental research. Since more and more educators are becoming involved in research and since nonparametric methods are increasing in number and in versatility of application, it is essential that active educators and behavioral researchers be informed and kept up to date on advances made in this important area of research methodology.

Our intent was to plan each session so that there would be adequate time to cover the topic at hand with a minimum of stress on the participants. This was handled by scheduling three ninety minute sessions each day with a sixty minute informal discussion period at the conclusion of the day's lectures. We restricted outselves to those nonparametric techniques which we believed to be potentially the most important and useful to researchers in education and the behavioral sciences. We realized that researchers, no matter how diligent, could not achieve complete mastery of these techniques within the limited time period of the presession. We tried to introduce our participants to a wide variety of techniques during the presession and to provide them with extensive supporting materials to enable them to continue their independent study in nonparametric methods when the presession was completed.

In all cases the discussion and the use of tests and confidence intervals focused on applications. The mathematical development and proving of theorems and related results were not covered as a part of the formal lecture periods. These theoretical developments appeared as separate sections in the handout materials distributed to the presession participants.

4. Objectives:

Although this presession was primarily concerned with statistical techniques for the analysis of qualitative and quantitative variable, it was recognized that experimental design considerations will affect the participants' ability:

a. to provide interpretable estimates of treatment effects;

b. to employ precise statistical techniques in data analysis.

For this reason, the informal discussion periods were used for more extensive consideration of the design problems associated with the statistical techniques presented. To stimulate discussion of research design considerations and of nonparametric analysis procedures, many detailed examples of studies requiring a nonparametric analysis were presented as separate handouts.

It was hoped that exposure to these procedures would aid the participant in solving problems dealing with experimental design, hypothesis testing, and estimation commonly found in educational research. Specifically, it was our expectation that, as a result of participation in the presession and subsequent independent study of the presession materials, the participants would be able to:

a. Explain the rationale behind the test procedures presented.

b. Perform these tests on data from educational research.

c. Apply and extend the techniques learned to specific problems in educational research.

d. Distinguish between experimental designs in which variables are confounded and designs which provide interpretable estimates of treatment effects.

3. Employ 'precision' as one criterion in selecting an appropriate experimental design and the

'best' statistical test for a specific situation.

f. Read current literature involving methods described in this presession.

g. Direct other researchers in the use of these statistical techniques.

5. Schedule:

First Day: Morning:
Discussion of class objectives and a complete overview of the material to be covered during the presession (Penfield).
Irwin-Fisher exact test (McSweeney).

Afternoon:
Median test and Chi-square test of homogeneity (Wright).
Informal discussion

Second Day: Morning:
Extension of the median test to K samples (Penfield).
Confidence interval procedures for the Chi-square and median tests (McSweeney).

Afternoon:
Tests of independence in contingency tables (Porter).
Informal discussion.

Third Day: Morning:
Test of interaction across contingency tables and associated confidence interval procedures (Marascuilo).
The Wilcoxon test for matched-pairs and Spearman' rho (Porter).

Afternoon:
Friedman test and Kendall's coefficient of concordance (Porter).
Informal discussion.

Fourth Day: Morning:
Cochran's Q test and Kendall's tau (Lawton)
Mann-Whitney test (Penfield).

Afternoon:
Application of the Wilcoxon test to block designs and the test on aligned observations (McSweeney).
Informal discussion.

Fifth Day: Mroning:
Normal scores test (Penfield).
Kruskal-Wallis test (Porter).

Afternoon:
A complete review of all material covered (McSweeney).
Informal discussion.

6. Participants:

A total of 52 individuals were accepted for the presession, but only 30 arrived for active participation. For the 22 who did not attend, the most common reasons for failure to participate were lack of funds for travel and lodging and insufficient time upon receiving an acceptance notice to make the necessary arrangements.

As was true in previous years, the majority of the participants were males. Of the 30 people attending, only three were females. In our past two presessions, there has always been a larger proportion of males, but the dichotomy has never been quite this extreme.

This year a much larger percentage of the participants were in the 'under 30' category. There appears to be two major reasons for this large percentage of younger participants: 1. Professional staffs are acquiring younger members who find they need an upgrading of their basic statistical skills, and; 2. Many schools do not offer a course in nonparametric statistics and advanced graduate students find the presessions an excellent opportunity for acquiring needed information. It can also be pointed out that as a group, the participants were much better prepared to handle the material being presented than previous groups had been. This was especially true of the people over 40 years of age. We have always found the younger individuals to be very enthusiastic and excited over the practical use they derive from the lectures and discussion sections.

Most individuals hold a position at a university or college. There is still an interest in nonparametric statistics from individuals employed by research centers across the country, but due to cutbacks in federal funding only a limited number of resident staff members participated in the presession. A number of letters and telephone calls were received indicating a desire to attend, but due to a curtailment of funds it was deemed impossible.

Most participants were attending an AERA presession for the first time. Only six out of the thirty had attended a session previously and two of these six had attended our nonparametric session in 1968. It was hoped that the spacing of the lectures would reduce tensions that might exist for those attending their initial presession.

Most of the participants are either just completing their degree or are recent graduates in their first three years of completion. The whole purpose of the presessions is to provide an opportunity for people who have been out of graduate school for a number of years to learn about new innovations in educational research. Obviously, this presession is not drawing from the older audience. Many older professors have moved into administrative positions and find little need for the techniques we are offering. In order to be competitive, however, the younger faculty must make a concerted effort to acquire skills conducive to good educational research.

The level of statistical competency as measured by the number of previously taken statistics courses was higher in 1970 than for either of the two previous years this course was taught. This was mentioned previously and is a real tribute to the graduate programs from which these individuals are graduating. They proved to be very alert and knowledgeable about elementary statistics. This means that they are able to derive much more benefit from the material being presented while allowing the instructors greater freedom in their presentations.

The majority of participants have the greatest proportion of their time devoted to research. Over 60 percent of the people are spending more than 50 percent of their time on research activities. This result is similar to what was found to be true in 1968 and 1969. This year's group, however, is spending much less time in the classroom than previous years' groups. Thus, the material covered in this presession will be essential for them in their research endeavors.

It is interesting to note that most of the participants actually have published very little to date. This is somewhat related to the fact that they are young or graduate students or have only recently finished their degrees. The profile of percentages conforms to the pattern set over the past two years. Perhaps those who do publish extensively already possess a knowledge of the material being presented and thus have little desire to attend. It is hoped that in future years the participants will use the techniques learned at this presession to develop their own research activities.

Five people were from the East, seven from the South, ten from the Midwest and six from the West. It was expected that the draw would be small outside the Midwest region. The East, however, was a disappointment with only five participants. Certainly the proximity to the location of the presession is an important factor in attendance.

7. Instructional and Evaluation Materials:

Detailed lectures and handouts describing studies which employed nonparametric analyses were prepared and distributed to each participant. They were fitted into a handsome looseleaf notebook costing all of $.79. Participants could refer to the multilithed lecture notes as the instructor lectured. This allowed for a minimum of blackboard writing. Since we have always been plagued by a lack of board space, having the lectures written up provided a valuable tool for effective presentation of material. It was also true that the lighting in the classroom left something to be desired so the printed lectures were even more appreciated.

The printed lectures were somewhat more thorough in coverage than the oral presentations since they included derivations of the test statistics, and annotated references as well as an 'intuitive' development of the techniques and examples of their use. The more extensive presentation provided by the written lecture notes was thought desirable since the participants would have permanent copies of the presession materials to be reviewed at their leisure. That the participants shared this view of the usefulness of the materials was indicated by comments of several participants on the final evaluation forms:

"The printed materials should prove to be a most valuable resource when I return to my lab. They were tremendously valuable as a follow-up each evening as I reviewed the day's work."

"The amount and intensity of material presentation can be assimilated best by reading the well-prepared mimeo lecture material in the next month or so. It needs a while to soak in."

"The pace was quite rapid, but the overview was such that there is a sound base for getting conceptual and computational mastery at a later time."

"Vast quantities of very complex material were presented. I spent a portion of each evening studying. I feel this was appropriate and would have felt cheated if the session had been less demanding. Handout materials (approximately 300 pages) were most valuable..."

8. Evaluation and Test Results:

At the conclusion of the day's lectures, each participant was given a multiple choice test covering the day's material. This was turned in the following morning, corrected, and returned to the participant.

A total of four tests were given and corrected. It was interesting to note that a number of the older participants failed to hand in their tests. No effort was made to collect the exams since this would only have caused considerable embarrassment to the individuals and created an uneasy situation for the rest of the session. The statistics for the four tests are as follows:

Test	Mean Number Correct	Maximum Score Possible
1	6	7
2	10	12
3	11	16
4	10	15

The staff was exceedingly pleased with the performance of individuals on the exams. The majority of the participants made a concerted effort to attempt the questions and thus consolidate the learning that had taken place during the day.

9. Director's Evaluation:

At the conclusion of this presession a questionnaire developed by the coordinator of the AERA Presessions in cooperation with the directors of the individual sessions was distributed to each participant. The responses of the participants were generally quite favorable. Further comments added by some of the participants were supportive of the efforts of the presession staff and included valuable suggestions for the improvement of the presession. Particularly promising suggestions seemed to be:

1. The development of a listing of computer programs in nonparametric statistics that would be available to the participants.

2. The formation of small study groups to reinforce lectures and larger group discussions.

3. Greater specificity in indicating the background material to be reviewed by the participants prior to presession attendance.

Since the conclusion of the presession, two participants have written to express their thanks for help given at the presession and to indicate to the staff that they are using the techniques taught at the presession.

"Your lectures, instruction and lecture notes gave me a much clearer understanding of both parametric and nonparametric statistical procedures than I thought possible..."

"We had a show and tell session here at the Bureau [of research] yesterday. I gave a brief summary of our session and presented transparencies of the outlines of the various tests. I think it was the first time many of our professional staff realized that there were post hoc procedures available for nonparametrics. Hodges-Lehmann Test, Lancaster Procedures and Normal Scores Tests really impressed the staff, and were apparently new to them."

It was particularly gratifying to the staff to note that all of the participants responding to the final evaluation felt that they would "use what [they had] learned in [their] own teaching or research in the immediate future [and] at a later date in future research or teaching."

In a recent Review of Educational Research article it was observed that, "No matter how powerful the newer nonparametric techniques are, their usefulness will depend ultimately on the diligence of applied statisticians in explaining them and on the receptivity of behavioral researchers to these methodological advances." We believe that the conscientious efforts of the participants of this presession, their avid interest in research methodology, and their eagerness to update their knowledge of research design and statistical analysis create the expectation that the participants will indeed employ what they have learned at this presession in their future professional activities. The fulfillment of such an expectation would amply repay the efforts of the staff in preparing and presenting this presession.

The presession Powerful Statistical Techniques for Qualitative as well as Quantitative Variables was held in Minneapolis at the Pick-Nicollet Hotel from February 26 to March 2, 1970. Thirty people attended. Three lectures and one discussion session were held each day over a total of five days. The participants appeared to be well prepared in elementary statistical techniques and seemed to benefit greatly from the material being presented. Many said it was one of the most worthwhile set of five days they had spent in some time. Lecture notes were distributed to each participant for use at the presession and for future reference. It was hoped by the staff that the exposure of the participants to these nonparametric techniques would make them better researchers in the years to come.